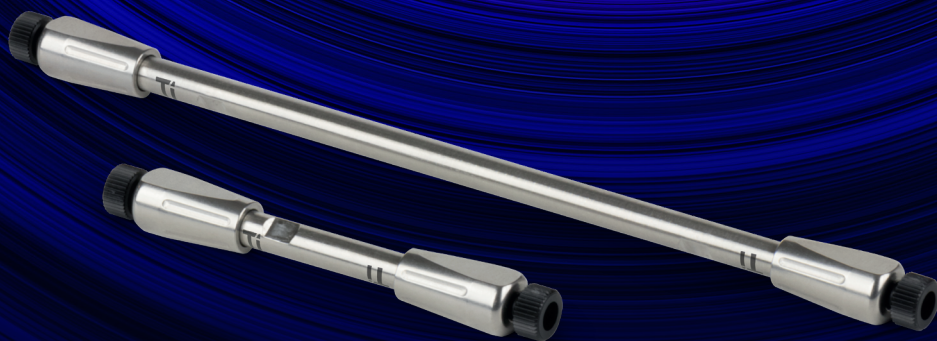


Achieve Better Resolution for Large Biologics with

New bioZen WidePore C4

- Optimal Wide Pore Distribution on a Core-Shell Particle
- Better Resolution for Intact mAbs and Subunit Analysis



What to Expect with

bioZen™ WidePore C4

p. **4** Part of the bioZen Portfolio



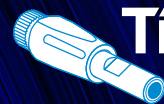
Novel
Particles

+

8

Chemistries

+



Biocompatible
Hardware

+



Technical
Gurus

pp **5-6** Easy Efficiency Gains When Using
bioZen WidePore C4 Core-Shell Particle

- *Improved Resolution, Sensitivity, and Speed with Core-Shell Technology*
- *Better Separation with Optimal Pore Size Distribution*
- *Enhanced Peak Shape Driven by Bioinert Hardware*

p. **7** Generating Next Level of Reliability
Through Advanced Process Optimization

pp **8-11** Intact and Subunit Applications Designed
to Widen Your Expectations

p. **12** A Team of Technical Bioseparation Experts
to Help and Connect YOU

p. **13** Ordering Information

Intact & Subunit Applications

Impurity profiling and characterization of intact biologic fragments is a challenging undertaking because of the need to identify very small differences between variants. bioZen™ WidePore C4 columns contain skillfully manufactured large pore core-shell particles that provide narrower, taller peaks in conjunction with higher resolution between the target HC/LC, Fc/Fab, or isoforms and are ideal for large biologics to optimize analysis.

- **Diverse Intact mAb Chromatographic Comparison using bioZen WidePore C4**

Cetuximab p. 8

Infliximab p. 8

Infliximab Biosimilar p. 8

Rituximab p. 8

- **Method Optimization for WidePore C4**

Flow Rate p. 9

Temperature p. 10

Gradient p. 11

More Applications Available Online >>

www.phenomenex.com/bioZenWidePore

BE-HAPPY™
guarantee

Your happiness is our mission. Take 45 days to try our products. If you are not happy, we'll make it right.

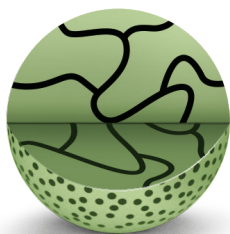
www.phenomenex.com/behappy

Introducing

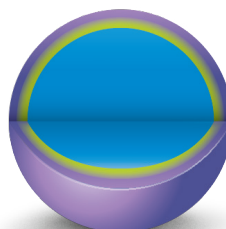
A New Solution for Your Intact mAbs and Subunit Analysis with bioZen™

With a single innovative product line, bioZen separation products provide enhanced characterization over an incredibly wide range of techniques.

3 Particle Platforms



Thermally Modified Fully Porous



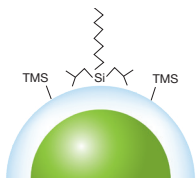
Monosized Polymeric Non-Porous



Core-Shell Technology

8 Particle Chemistries

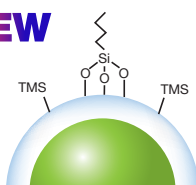
Intact/Subunit



bioZen Intact XB-C8
3.6 μm

Large pore core-shell particle for fast intact and subunit biologic entry. C8 provides highly useful moderate hydrophobic selectivity.

NEW



bioZen WidePore C4
2.6 μm

Core-shell particle with butyl stationary phase and optimal wide pore size distribution for better resolution of large biologics, including monoclonal antibodies and subunit analysis.

Size Exclusion (SEC)



bioZen SEC-2
1.8 μm

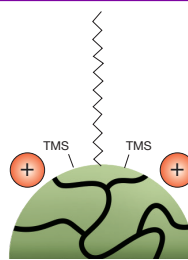
Extremely inert, high density fully porous particle with high efficiency and low molecular weight (LMW) separation range of 1k–450 kDa.



bioZen SEC-3
1.8 μm

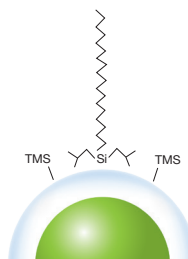
Extremely inert, high density fully porous particle with high efficiency and high molecular weight (HMW) separation range of 10k–700 kDa.

Peptide



bioZen Peptide PS-C18
1.6 μm and 3 μm

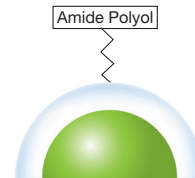
Excellent retention by combined positively charged surface ligand and C18 ligand.



bioZen Peptide XB-C18
1.7 μm and 2.6 μm

Overall retention of both acidic and basic peptides through C18 stationary phase with di-isobutyl side chains.

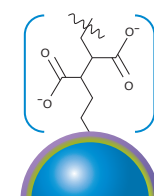
Glycan



bioZen Glycan
2.6 μm

Provides optimal combination of high efficiency and selectivity for released glycans.

Ion-Exchange



bioZen WCX
6 μm

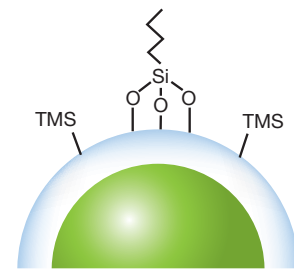
Monosized particles grafted with linear polycarboxylate chains to envelop and separate proteins from acidic/basic variants

Advanced C4 Chemistry

bioZen™ 2.6 µm WidePore C4 is an intact core-shell reversed phase column that provides good peak shape and selectivity for both intact monoclonal antibodies (mAbs) and subunit analyses. Its robust surface grafting and optimal particle and pore size morphology ensures high reproducibility for analytical methods.

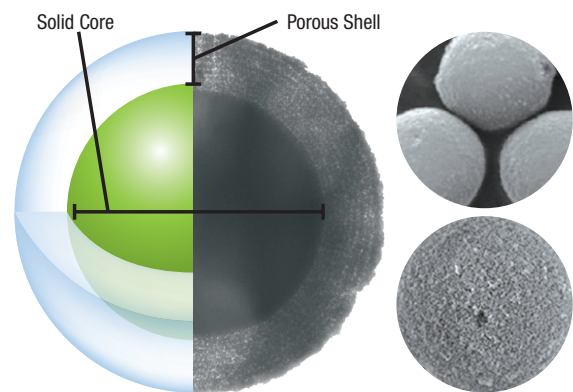
bioZen WidePore C4 is designed for better resolution of large biologics using:

- Core-Shell Advantage for High Efficiency
- Optimal Pore Size for Better Separation
- Bioinert Hardware for Improved Peak Shape
- Robust Surface Chemistry for Improved Column Stability

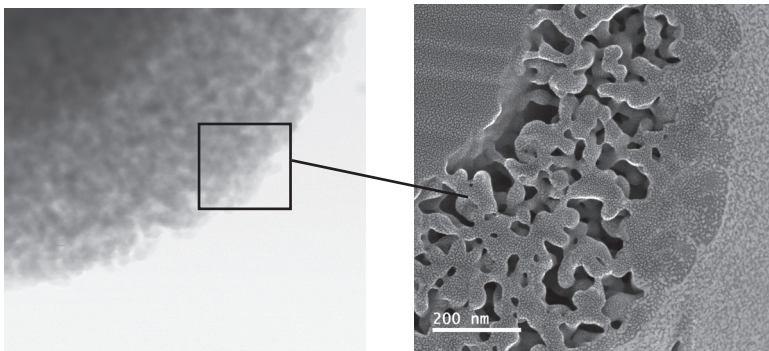


Core-Shell Advantage

For an **increase in resolution**, along with faster and **more consistent results**, our scientists create a durable, homogeneous spherical porous shell **uniformly** grown on a solid silica core.

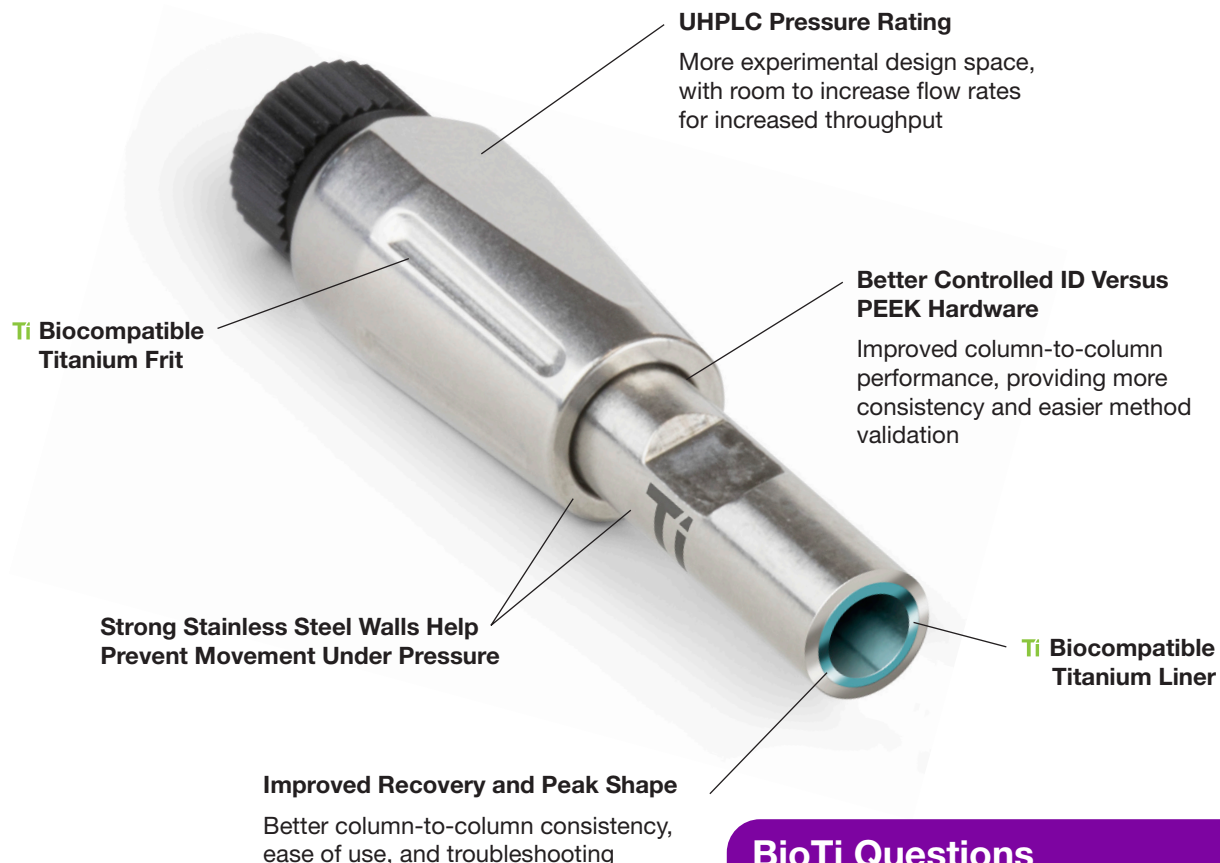


Controlled Wide Pore Technology



A **wider pore LC column (~400Å)** allows for better separation of large biologics and with a **controlled manufacturing process**, bioZen WidePore introduces a new solution for analyzing intact and subunit mAbs.

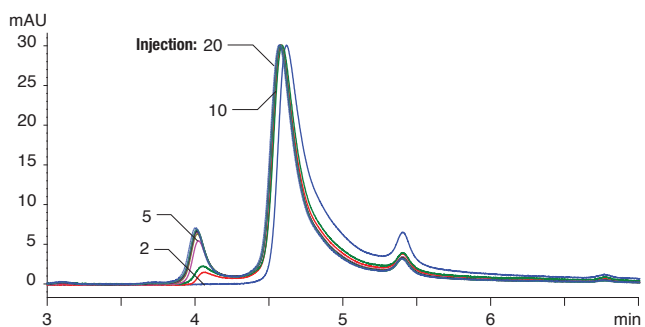
Inside bioZen™ BioTi™ Biocompatible Hardware



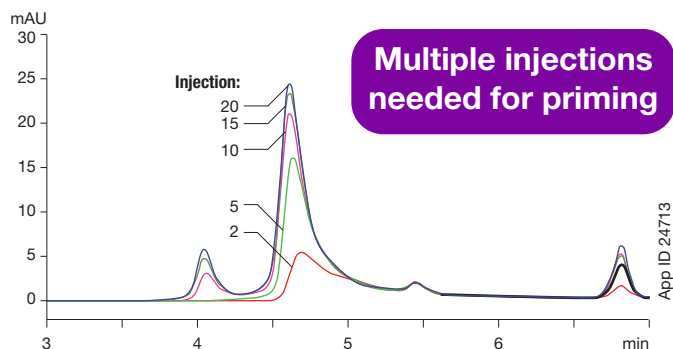
BioTi Questions

www.phenomenex.com/bioZenChat

bioZen Titanium BioTi Hardware



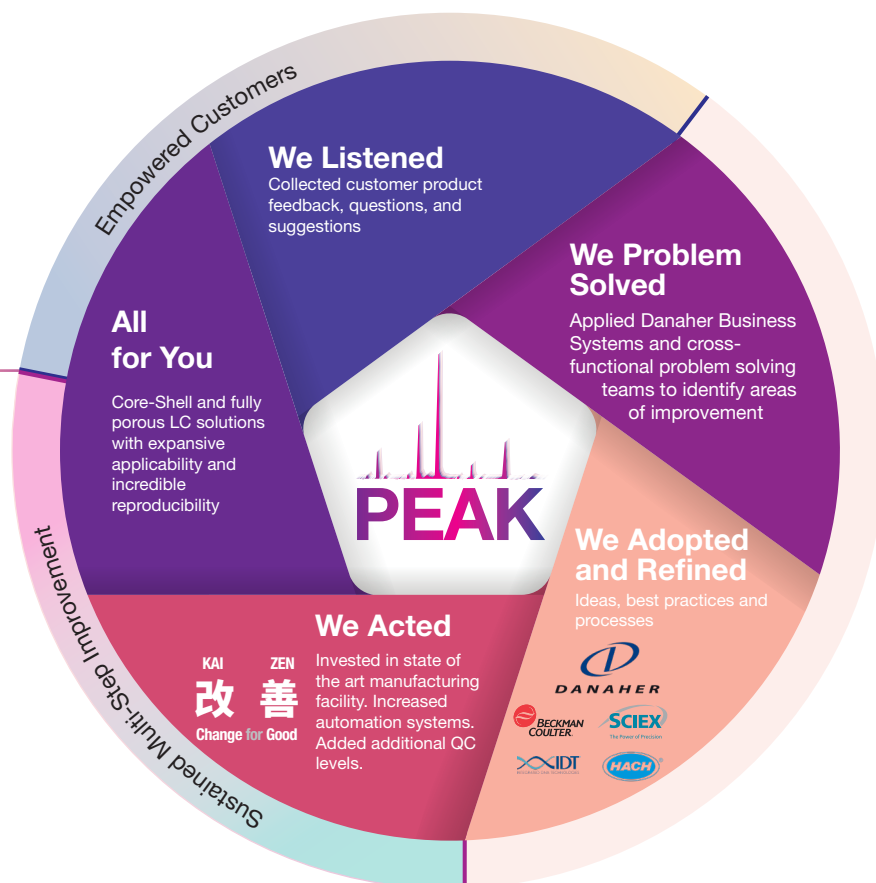
Traditional Stainless Steel



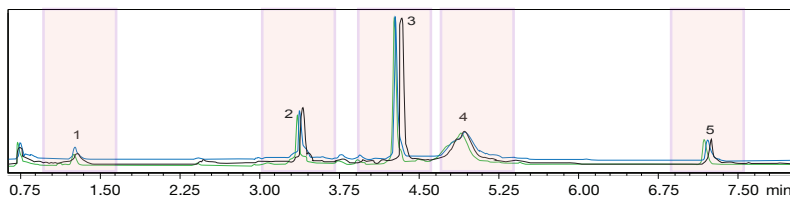
Generating the Next Level Of Reliability Through Advanced Process Optimization

Over the past three years, our scientists and engineers with the help of customers and Danaher colleagues, have optimized our processes to provide products that deliver very high levels of performance and newly achievable levels of reliability and reproducibility. This new advanced series of products and process optimization is called PEAK.

PEAK



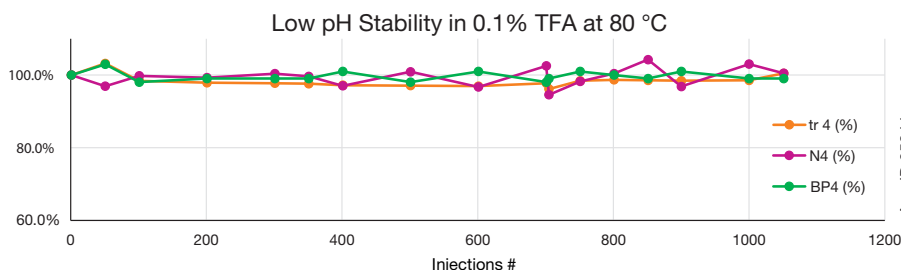
Excellent Batch-to-Batch Consistency



LC Conditions

Column: bioZen™ 2.6 µm WidePore C4
Dimension: 100 x 2.1 mm
Part No.: OOD-4786-AN
Mobile Phase: A: 0.1 % TFA in Water
 B: 0.1 % TFA in Acetonitrile
Gradient: 25-60 % B in 5 minutes
Flow Rate: 0.3 mL/min
Temperature: 60 °C
Detection: UV @ 280 nm
Sample: 1. RNase A (13.7 kD)
 2. Cytochrome C (12 kD)
 3. Lysozyme (14.3 kD)
 4. Holotransferrin (76-81 kD)
 5. Apomyoglobin (16 kD)

Excellent Robustness

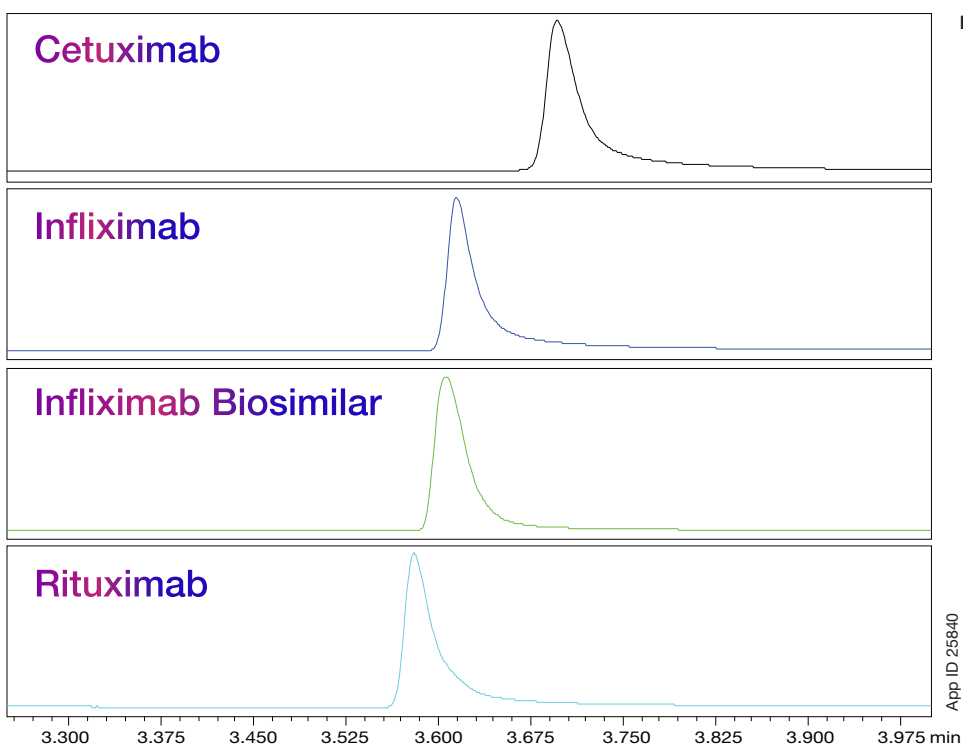


LC Conditions

Column: bioZen 2.6 µm WidePore C4
Dimension: 100 x 2.1 mm
Part No.: OOD-4786-AN
Mobile Phase: A: 0.1 % TFA in Water
 B: 0.1 % TFA in Acetonitrile
Gradient: 15-55 % B in 10 minutes (total run time 20 minutes)
Flow Rate: 0.8 mL/min
Temperature: 80 °C
Detection: UV @ 280 nm
Sample: Trastuzumab

Diverse mAb Comparison with Chromatographic Performance Suitable for Intact MS Analysis

- High throughput and single method for multiple mAb analysis
- High temperature leads improved peak shape for all mAbs
- Formic acid mobile phase ensures sensitivity for intact mass by high resolution MS



LC Conditions
Column: bioZen™ 2.6 µm WidePore C4
Dimension: 100 x 2.1 mm
Part No.: 00D-4786-AN
Mobile Phase: A: 0.1 % Formic acid in Water
 B: 0.1 % Formic acid in Acetonitrile
Gradient: 10-90 % B in 4 minutes
Flow Rate: 0.3 mL/min
Temperature: 80 °C
Detection: UV @ 280 nm
Sample: mAbs, Various (1 mg/mL)

App ID 25840

Sample	Retention Time (min)	Width @ 50 %
Rituximab	3.580	0.0233
Infliximab Biosimilar	3.606	0.0272
Cetuximab	3.696	0.0270
Infliximab	3.615	0.0222

Improved peak shape for intact mass applications by high resolution MS.

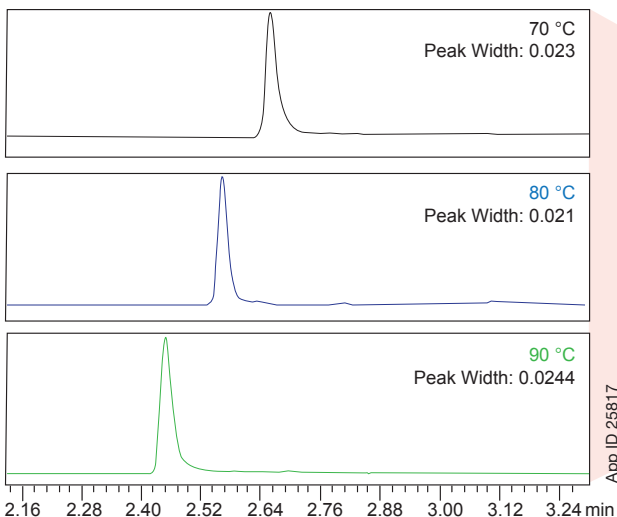
Temperature Effects on Intact and Subunit Analysis

- Displays improved temperatures for Intact Influximab and Reduced NIST mAb at 70, 80, and 90 °C
- 80 °C exhibits narrowest and most ideal peak shape for both the intact and subunit analysis

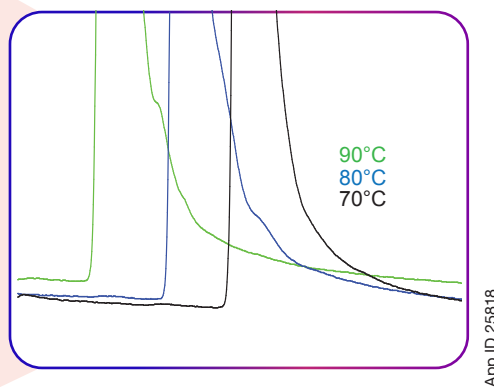
LC Conditions

Column: bioZen™ 2.6 µm WidePore C4
Dimension: 100 x 2.1 mm
Part No.: 00D-4786-AN
Mobile Phase: A: 0.1 % TFA in Water
 B: 0.1 % TFA in Acetonitrile
Gradient: 20-55 % B in 6 minutes (Intact)
 25-45 % B in 6 minutes (Subunit)
Flow Rate: 0.5 mL/min
Temperature: As Indicated
Detection: UV @ 280 nm (Intact)
 UV @ 214 nm (Subunit)
Sample: Influximab (1 mg/mL)
 DTT-reduced NIST mAb (1 mg/mL)

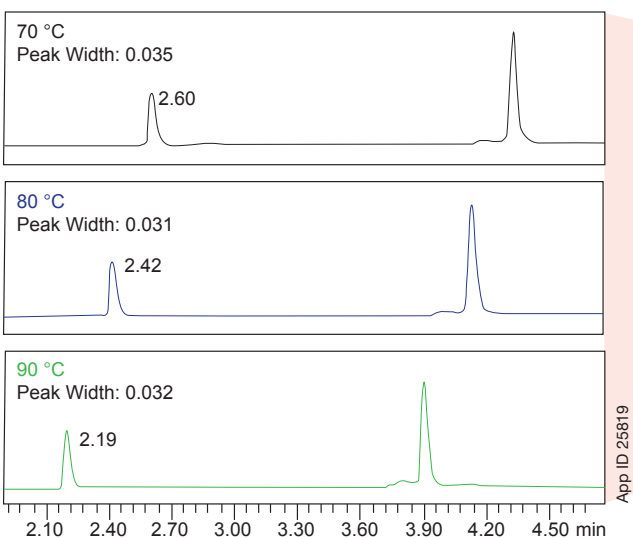
Intact Influximab



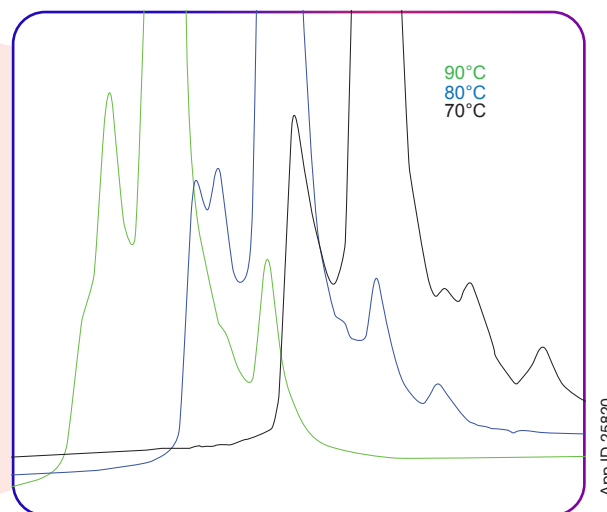
Intact Detailed Overlay



HC/LC Subunit Analysis of NIST mAb



Heavy Chain Detailed Overlay



Ideal peak shape at 80 °C with high temperature stability using bioZen WidePore C4

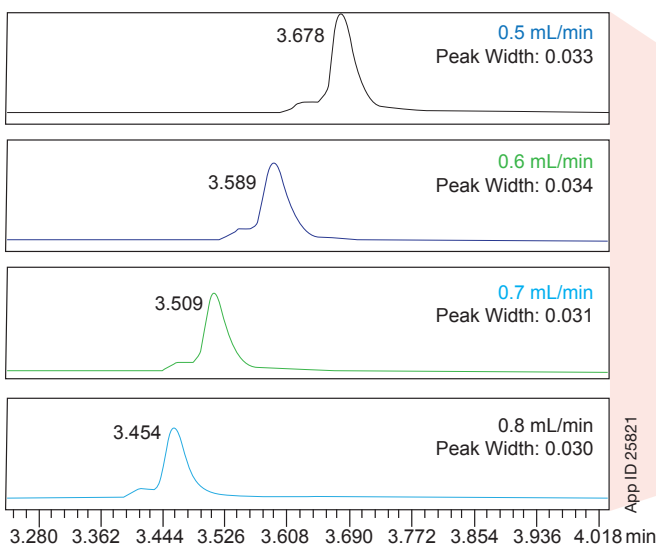
Flow Rate Effects on Intact and Subunit Analysis

- Comparing 0.5, 0.6, 0.7, 0.8 mL/min flow rates for peak capacity of NIST mAb
- Faster flow rates help overcome slow diffusion rates and provides sharp, narrowing peaks
- Higher flow rates lead to higher throughput

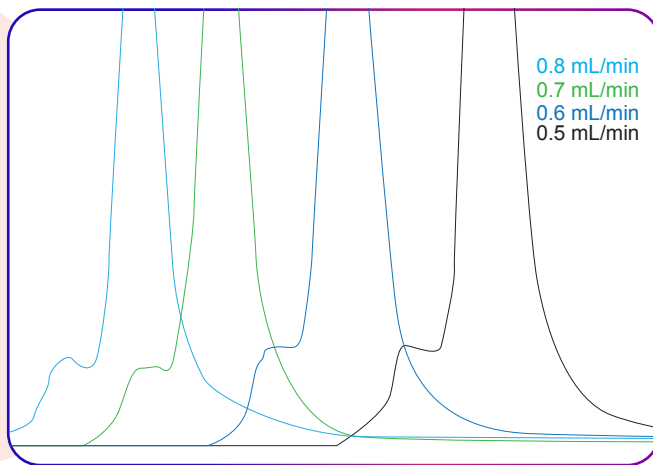
LC Conditions

Column: bioZen™ 2.6 µm WidePore C4
Dimension: 100 x 2.1 mm
Part No.: 00D-4786-AN
Mobile Phase: A: 0.1 % TFA in Water
 B: 0.1 % TFA in Acetonitrile
Gradient: 25-45 % B in 6 minutes
Flow Rate: As indicated
Injection Volume: 2 µL
Temperature: 90 °C
Detection: UV @ 280 nm (Intact)
 UV @ 214 nm (Subunit)
Sample: NIST mAb (1 mg/mL)
 DTT-reduced NIST mAb (1 mg/mL)

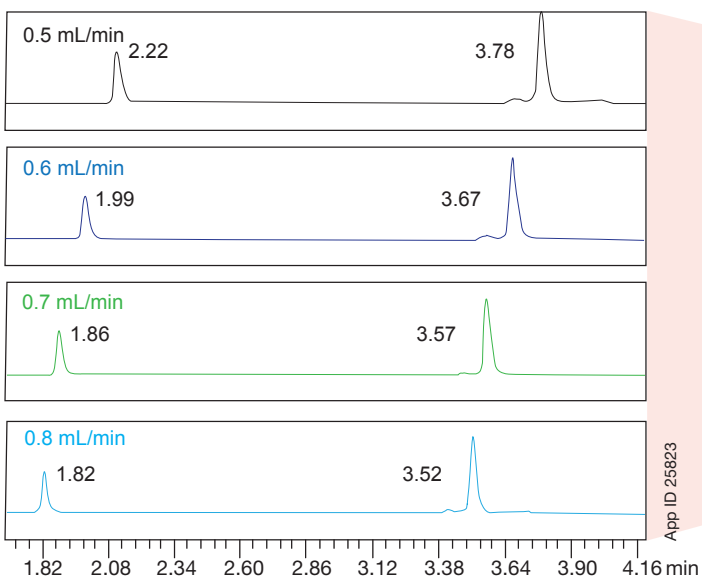
Intact NIST mAb Flow Rate



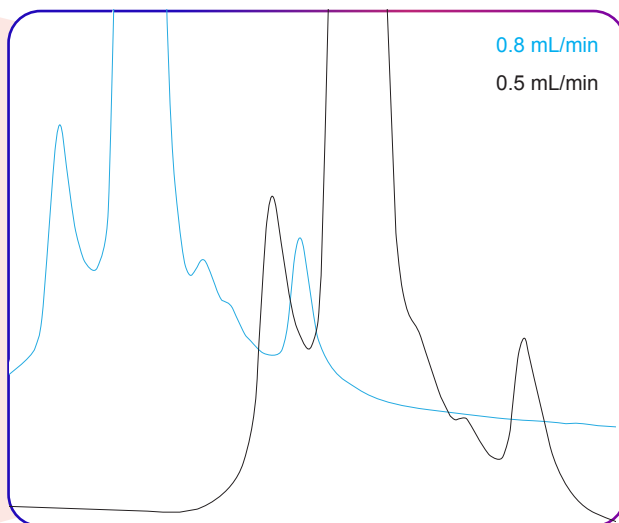
Intact Analysis Detailed Overlay



Subunit Analysis of NIST mAb



Detailed Overlay Comparison

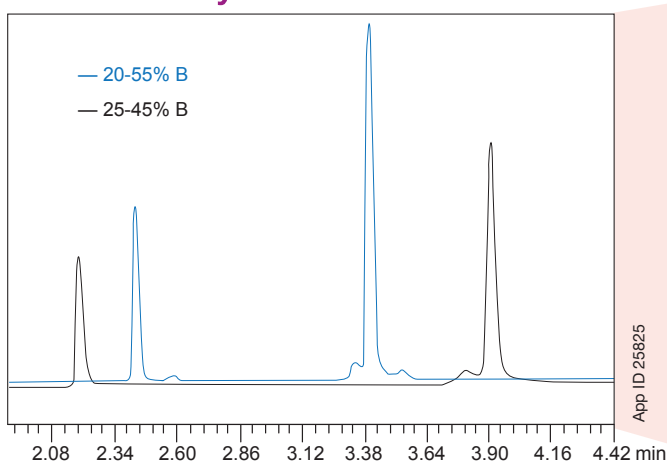


A late eluting variant can be observed at 0.8 mL/min but not in 0.5 mL/min

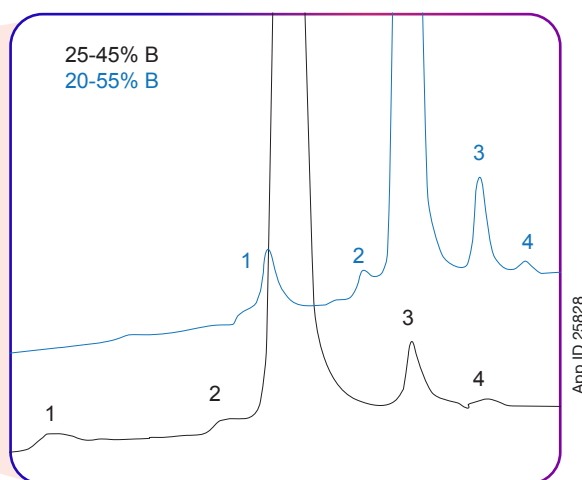
Gradient Effects on NIST mAb Subunit Analysis

- Comparing gradient effects of changing 20-55% B to 25-45% B
- Shallowing of gradient slope provides improved resolution and enable characterization of closely eluting impurities

Subunit Analysis of NIST mAb



Reduced Detailed Overlay



bioZen WidePore C4 displays an increase in resolution

LC Conditions

Column: bioZen™ 2.6 µm WidePore C4
Dimension: 100 x 2.1 mm
Part No.: 00D-4786-AN
Mobile Phase: A: 0.1 % TFA in Water
B: 0.1 % TFA in Acetonitrile
Gradient: As indicated
Flow Rate: 0.5 mL/min
Injection Volume: 2 µL
Temperature: 90 °C
Detection: UV @ 280 nm (Intact)
UV @ 214 nm (Subunit)
Sample: DTT-reduced NIST mAb (1 mg/mL)

Interested in learning more about these applications?

Go to
www.phenomenex.com/bioZenWidePore
to view these applications and more

Ordering Information

bioZen™ Products - Powered by Biocompatible Hardware

bioZen Columns (mm)	Columns							Biocompatible Guard Cartridges		
	50 x 2.1	100 x 2.1	150 x 2.1	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	for 2.1 mm	for 4.6 mm	Holder
								/3pk	/10pk	ea
bioZen 2.6 µm Glycan	00B-4773-AN	00D-4773-AN	00F-4773-AN	—	—	—	—	AJO-9800	—	AJO-9000
bioZen 1.6 µm Peptide PS-C18	00B-4770-AN	00D-4770-AN	00F-4770-AN	—	—	—	—	AJO-9803	—	AJO-9000
bioZen 3 µm Peptide PS-C18	00B-4771-AN	—	00F-4771-AN	00B-4771-E0	—	00F-4771-E0	—	AJO-7605	AJO-7606	KJO-4282
bioZen 1.7 µm Peptide XB-C18	00B-4774-AN	00D-4774-AN	00F-4774-AN	—	—	—	—	AJO-9806	—	AJO-9000
bioZen 2.6 µm Peptide XB-C18	00B-4768-AN	00D-4768-AN	00F-4768-AN	00B-4768-E0	—	00F-4768-E0	—	AJO-9806	AJO-9808	AJO-9000
bioZen 2.6 µm WidePore C4	00B-4786-AN	00D-4786-AN	00F-4786-AN	00B-4786-E0	00D-4786-E0	00F-4786-E0	00G-4786-E0	AJO-9809	AJO-9811	AJO-9000
bioZen 3.6 µm Intact XB-C8	00B-4766-AN	00D-4766-AN	00F-4766-AN	00B-4766-E0	—	00F-4766-E0	—	AJO-9812	AJO-9814	AJO-9000

bioZen Columns (mm)	Columns							Biocompatible Guard Cartridges			
	50 x 2.1	100 x 2.1	150 x 2.1	250 x 2.1	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	300 x 4.6	for 4.6 mm	Holder
										/3pk	ea
bioZen 1.8 µm SEC-2	00B-4769-AN	—	00F-4769-AN	—	—	—	00F-4769-E0	—	00H-4769-E0	AJO-9850	AJO-9000
bioZen 1.8 µm SEC-3	00B-4772-AN	—	00F-4772-AN	—	—	00D-4772-E0	00F-4772-E0	—	00H-4772-E0	AJO-9851	AJO-9000

bioZen Columns (mm)	Columns							Biocompatible Guard Cartridges			
	50 x 2.1	100 x 2.1	150 x 2.1	250 x 2.1	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	300 x 4.6	for 4.6 mm	Holder
										/10pk	ea
bioZen 6 µm WCX	00B-4777-AN	00D-4777-AN	00F-4777-AN	00G-4777-AN	00B-4777-E0	00D-4777-E0	00F-4777-E0	00G-4777-E0	—	AJO-9400	KJO-4282

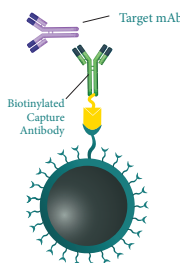
Sample Preparation

bioZen Solid Phase Extraction	Format	Sorbent Mass	Part Number	Unit
bioZen N-Glycan Clean-Up	Microelution 96-Well Plate	5 mg/well	8M-S009-NGA	1/box



bioZen MagBeads Streptavidin Coated

Formats	Part No.	Concentration	Bead Size
25 mg (≈50 samples)	KSO-9531	20 mg/mL	1.0 µm
50 mg (≈100 samples)	KSO-9532		
500 mg (≈1000 samples)	KSO-9533		



BE-HAPPY™

guarantee

Your happiness is our mission. Take 45 days to try our products. If you are not happy, we'll make it right.

www.phenomenex.com/behappy

Available to Chat 24/7

for Method Development and Optimization



Chat Now

www.phenomenex.com/ChatNow



WidePore C4

Australia

t: +61 (0)2-9428-6444
auinfo@phenomenex.com

Austria

t: +43 (0)1-319-1301
anfrage@phenomenex.com

Belgium

t: +32 (0)2 503 4015 (French)
t: +32 (0)2 511 8666 (Dutch)
beinfo@phenomenex.com

Canada

t: +1 (800) 543-3681
info@phenomenex.com

China

t: +86 400-606-8099
cninfo@phenomenex.com

Denmark

t: +45 4824 8048
nordicinfo@phenomenex.com

Finland

t: +358 (0)9 4789 0063
nordicinfo@phenomenex.com

France

t: +33 (0)1 30 09 21 10
franceinfo@phenomenex.com

Germany

t: +49 (0)6021-58830-0
anfrage@phenomenex.com

India

t: +91 (0)40-3012 2400
indiainfo@phenomenex.com

Ireland

t: +353 (0)1 247 5405
eireinfo@phenomenex.com

Italy

t: +39 051 6327511
italiainfo@phenomenex.com

Luxembourg

t: +31 (0)30-2418700
nlinfo@phenomenex.com

Mexico

t: 01-800-844-5226
tecnicomx@phenomenex.com

The Netherlands

t: +31 (0)30-2418700
nlinfo@phenomenex.com

New Zealand

t: +64 (0)9-4780951
nzinfo@phenomenex.com

Norway

t: +47 810 02 005
nordicinfo@phenomenex.com

Poland

t: +48 (12) 881 0121
pl-info@phenomenex.com

Portugal

t: +351 221 450 488
ptinfo@phenomenex.com

Singapore

t: +65 800-852-3944
sginfo@phenomenex.com

Spain

t: +34 91-413-8613
espinfo@phenomenex.com

Sweden

t: +46 (0)8 611 6950
nordicinfo@phenomenex.com

Switzerland

t: +41 (0)61 692 20 20
swissinfo@phenomenex.com

Taiwan

t: +886 (0) 0801-49-1246
twinfo@phenomenex.com

United Kingdom

t: +44 (0)1625-501367
ukinfo@phenomenex.com

USA

t: +1 (310) 212-0555
info@phenomenex.com

Ⓜ All other countries/ regions

Corporate Office USA

t: +1 (310) 212-0555
info@phenomenex.com



www.phenomenex.com

Phenomenex products are available worldwide. For the distributor in your country/region, contact Phenomenex USA, International Department at international@phenomenex.com

Terms and Conditions

Subject to Phenomenex Standard Terms and Conditions, which may be viewed at www.phenomenex.com/TermsAndConditions.

Trademarks

bioZen, BioTI, and BE-HAPPY are trademarks of Phenomenex.

FOR RESEARCH USE ONLY. Not for use in clinical diagnostic procedures.

© 2020 Phenomenex, Inc. All rights reserved.