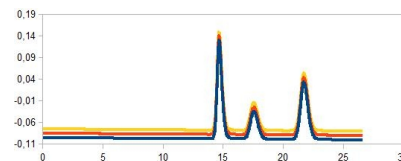
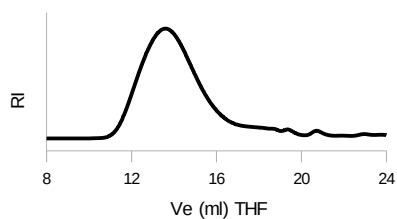


# GPC / SEC / HPLC Columns

## Made by AppliChrom GmbH

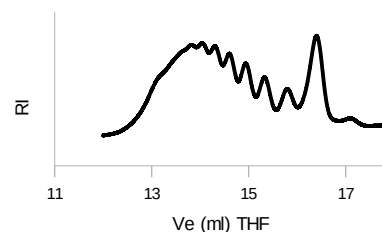


## AppliChrom StyDiViBe-P



PMMA

PMMA Oligomer



## AppliChrom StyDiViBe-P

AppliChrom GPC-columns for GPC analysis of organic molecules using (THF, toluene, chloroform)\*\*.

Oligomers and polymers including the new GPC media line from **AppliChrom BPT\* synthesis technology** for large range, high resolution separations with increased accuracy in calibration

- spherical high porous styrene-divinylbenzene GPC-media
- large molecular weight range: 100 → 10 000 000Da
- optimized for 1ml/min flowrate when using 8mm ID-columns
- high pressure stability of 150-50bar, depending on porosity
- high capacity from AppliChrom 8mm ID GPC columns  
(5% more capacity than 7.8mm columns, 14% more capacity than 7.5mm ID columns)
- plus extra high pore volume from AppliChrom GPC synthesis technology for an extra increasing of peak capacity and resolution
- proprietary AppliChrom GPC column packing procedure for accurate peak performance, low back pressures and an extension of column lifetime
- long column lifetime for reduction of costs even at high throughput screening applications
- high level of reproducibility
- high purity of AppliChrom GPC particles and columns for pure GPC mechanisms, low signal noise and reduction of „systempeaks“ after GPC run

GPC-examples (THF): Amylose acetat, amylose propionat,  
butyl rubber, cellulose diacetat, cellulosenitrat, polybutadiene, polycarbonate,  
polyisoprene, PMMA (polymethylmethacrylate), propylenglycol, polystyrene,  
polymethylstyrene, natural rubber, PVC (polyvinylchloride), polyvinylacetate, epoxid  
resins, polyisocyanate, polyols,  
polyurethans, plant oils/triglycerids/diglycerids,....

GPC-examples (toluene): Silicones, polydimethylsiloxan

GPC for epoxid resins, oligomers, isocyanates, PMMA / polymethylmethacrylate,  
polyethylmethacrylate, PS/polystyrene, vegetable oils /triglycerides/diglycerides,....,  
polybutadiene, polyisoprene, silicon / siliconoil / polydimethylsiloxane (in toluene),  
PEG / polyethylenglycol, polypropylenoxide, polyethylenglycol-polypropylen glycol-  
copolymer, PVC/polyvinylchloride, PU / polyurethane, celluloseacetate,  
diallylphthalate, dialkylphthalate, alkyd resin e.g...

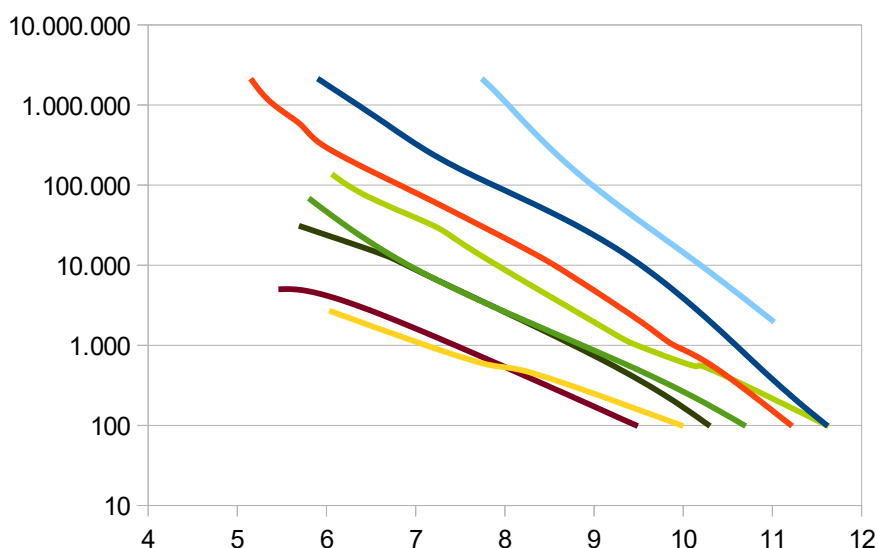
\* BPT: Broad Poredistribution Technology – easy calibration curve for large range of molecular sizes; lowered calibration artefacts compared to single pore combination columns.

\*\* Eluent THF, toluene or chloroform must be dry. If other eluents are planned – please ask us in advance. Please avoid: Eluent containing e.g. water, alcohols, acetonitril – can be relevant e.g. when using a combined HPLC/GPC system and/or in case a degasser is part of the chromatography system, avoid drying of column.

AppliChrom StyDiViBe molecular weight range and optimum range of molecular weights

	Range of molar mass	Optimum resolution
35A	100Da-2 500Da	<400Da
100A	100Da-10 000Da	ca. 800Da
500A	100Da-30 000Da	1 000Da -3 000Da
1 000A	100Da-70 000Da	3 000Da-10 000Da
1 500A - BPT	100Da-120 000Da <sup>*)</sup>	4 000Da–15 000Da
10E5A - BPT	500Da-1 500 000Da <sup>*)</sup>	10 000Da-150 000Da
10E6A - BPT	1 000Da-4 000 000Da <sup>*)</sup>	20 000Da-400 000Da
10E7A - BPT	1 000Da→10 000 000Da <sup>*)</sup>	30 000Da-2 000 000Da

Molecular sizes range of AppliChrom StyDiViBe GPC-Serie in detail:  
THF GPC-Calibration curves



**Analyte:**

**PMMA Standards**

Column:

- AppliChrom StyDiViBe-P-35A
- AppliChrom StyDiViBe-P-100A
- AppliChrom StyDiViBe-P-500A
- AppliChrom StyDiViBe-P-1000A
- AppliChrom StyDiViBe-P-1500A
- AppliChrom StyDiViBe-P-10E5A
- AppliChrom StyDiViBe-P-10E6A
- AppliChrom StyDiViBe-P-10E7A

Dimension:

e.a. 300mm x 8mm

Mobil Phase:

THF

Flow:

1.0ml/min

Temperature:

20°C

Detection:

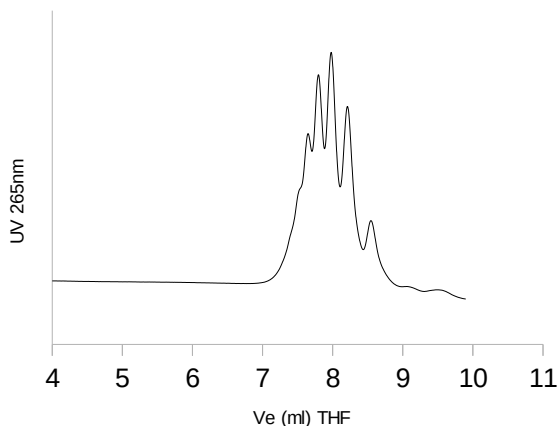
RI

Injection:

100µl sample

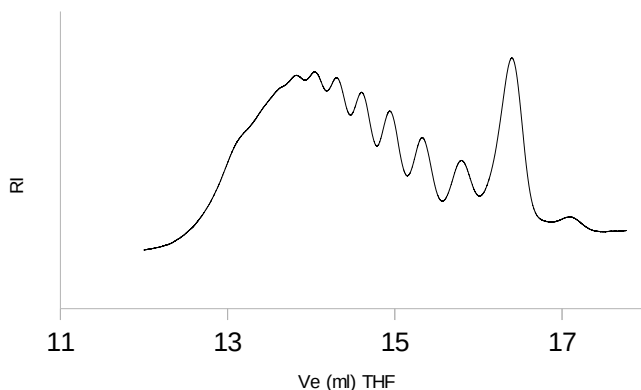
To cover a large range of molecular sizes GPC columns of suited porosities can be combined. This is the typical state of the art in many GPC laboratories. Also now it is useful if a special range of molecular sizes should be zoomed by GPC. But – in some single cases this also results in more or less obvious inhomogenities of calibration curves that itself makes accurate mathematics of calibration challenging. To increase accuracy and to simplify the calibration AppliChrom developed the BPT\* synthesis technology for significant lowering the inhomogenities phenomena and to improve the results.

\* BPT: Broad Poredistribution Technology – easy calibration curve for large range of molecular sizes; lowered calibration artefacts compared to single pore combination columns.



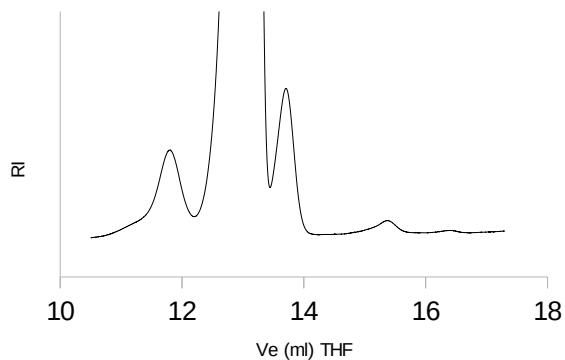
**Analyte:** Polystyrene (PS)  
**Mp = 578Da**

Column: AppliChrom StyDiV-Be-P-35A  
Dimension: 300mm x 8mm  
Mobil Phase: THF  
Flow: 1.0ml/min  
Temperature: 20°C  
Detection: UV 265nm  
Injection: 20µl sample



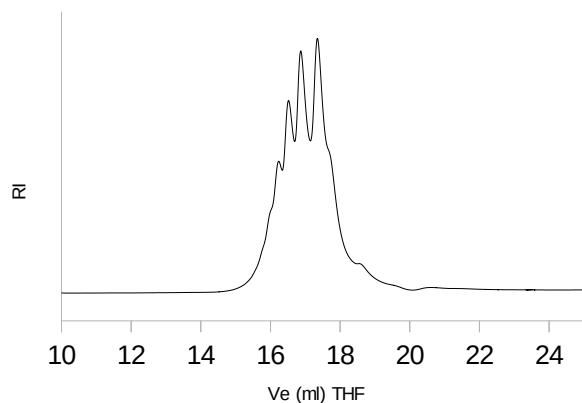
**Analyte:** Polymethylmethacrylate (PMMA) oligomer

Column: AppliChrom StyDiV-Be-P-100A  
Dimension: 2x 300mm x 8mm  
Mobil Phase: THF  
Flow: 1.0ml/min  
Temperature: 20°C  
Detection: RI  
Injection: 20µl sample



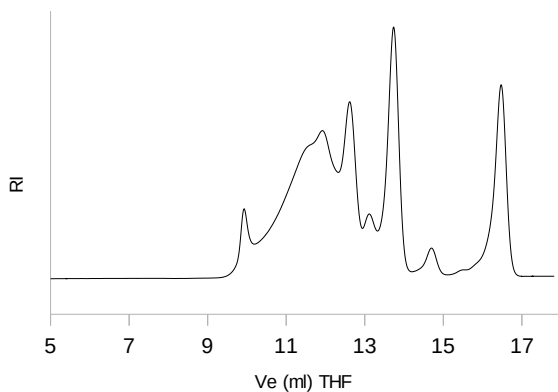
**Analyte:** Grapeoil (Triglyceride GPC)

Column: AppliChrom StyDiV-Be-P-100A  
Dimension: 2x 300mm x 8mm  
Mobil Phase: THF  
Flow: 1.0ml/min  
Temperature: 20°C  
Detection: RI  
Injection: 20µl sample

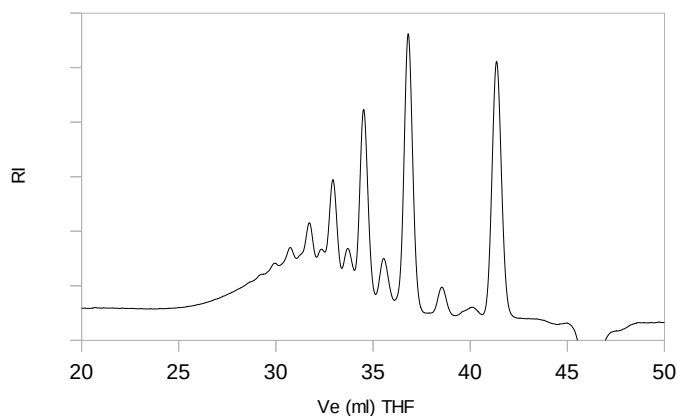


**Analyte:** Polyethylene glycol (PEG)  
**Mp = 200Da**

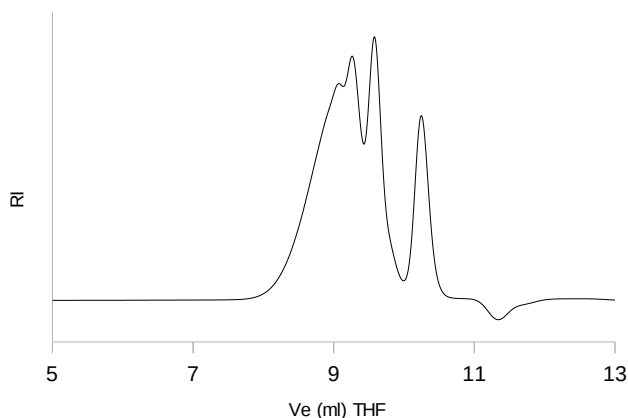
Column: AppliChrom StyDiV-Be-P-100A  
Dimension: 2x 300mm x 8mm  
Mobil Phase: THF  
Flow: 1.0ml/min  
Temperature: 20°C  
Detection: RI  
Injection: 20µl sample



Pore to small



Pore perfect



Pore to large

**Analyte: Bisphenol-A-Epichlorhydrin resin (I)**

Column: AppliChrom StyDiV-Be-P-100A

Dimension: 2x 300mm x 8mm  
Mobil Phase: THF  
Flow: 1.0ml/min  
Temperature: 20°C  
Detection: RI  
Injection: 20µl sample

High resolving GPC up to 10.000Da.

**Analyte: Bisphenol-A-Epichlorhydrin resin (I)**

Column: AppliChrom StyDiV-Be-P-1500A-BPT

Dimension: 2x 300mm x 8mm  
Mobil Phase: THF  
Flow: 0.5ml/min  
Temperature: 20°C  
Detection: RI  
Injection: 20µl sample

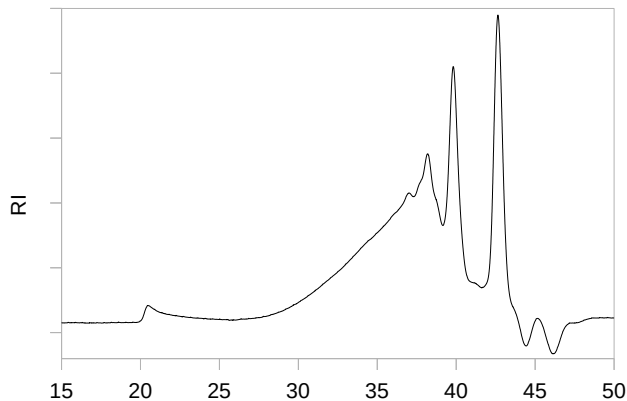
Good resolution, calibration range respective linearity in the range of 100-120 000Da, obtained from the special AppliChrom BPT-technology. No „surprising“ porosity artefacts from mixing particles with pores of different size for covering the full range of molecular sizes. Great resolution even if 8µl RI measuring cell is used.

**Analyte: Bisphenol-A-Epichlorhydrin resin (I)**

Column: AppliChrom StyDiV-Be-P-10E5A-BPT

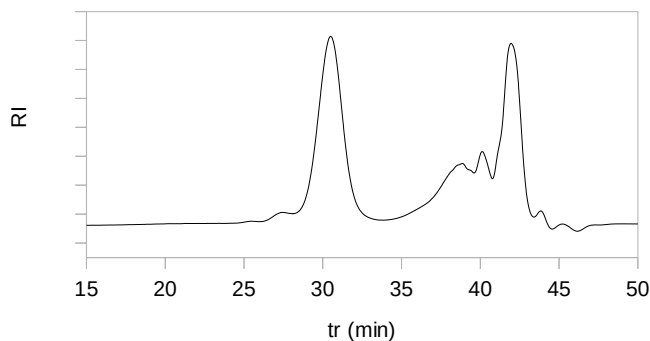
Dimension: 300mm x 8mm  
Mobil Phase: THF  
Flow: 1.0ml/min  
Temperature: 20°C  
Detection: RI  
Injection: 20µl sample

Good linearity from monomer up to 1 500 000Dalton, ideal for porosity gap artefact reduced GPC screening of large ranges of molecular weights combined with maintaining of oligomer resolution



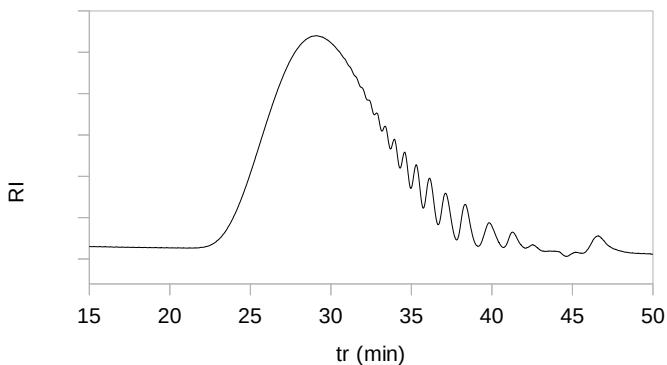
**Analyte: Polyol hard foam**

Column: AppliChrom StyDiV-Be-P-1500A-BPT  
Dimension: 2x 300mm x 8mm  
Mobil Phase: THF  
Flow: 0.5ml/min  
Temperature: 45°C  
Detection: RI  
Injection: 20µl sample



**Analyte: Polyol soft foam**

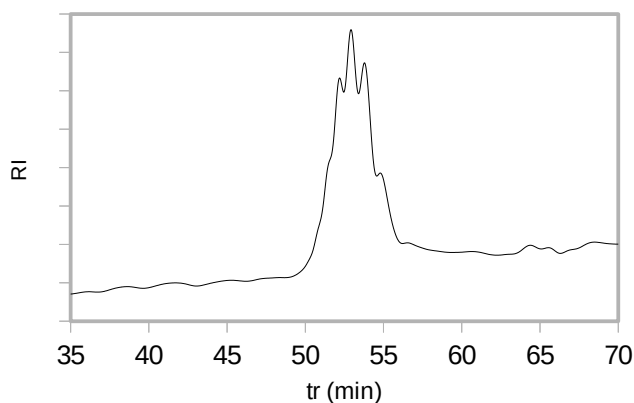
Column: AppliChrom StyDiV-Be-P-1500A-BPT  
Dimension: 2x 300mm x 8mm  
Mobil Phase: THF  
Flow: 0.5ml/min  
Temperature: 45°C  
Detection: RI  
Injection: 20µl sample



**Analyte: Aliphatic polyester**

(adipate polyester)  
including fingerprint

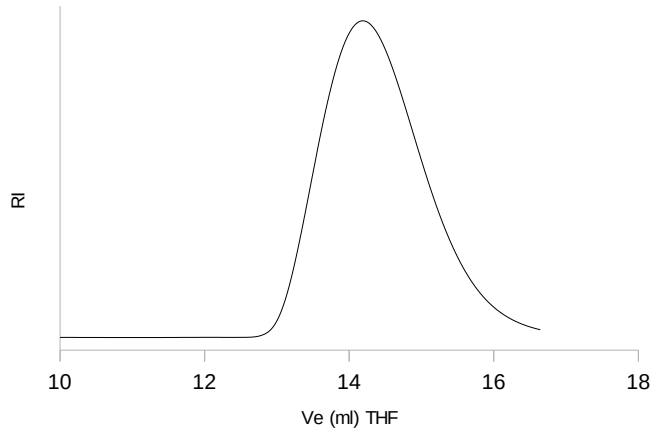
Column: AppliChrom StyDiV-Be-P-1500A-BPT  
Dimension: 2x 300mm x 8mm  
Mobil Phase: THF  
Flow: 0.5ml/min  
Temperature: 45°C  
Detection: RI  
Injection: 20µl sample



**Analyte: Polyether polyol**

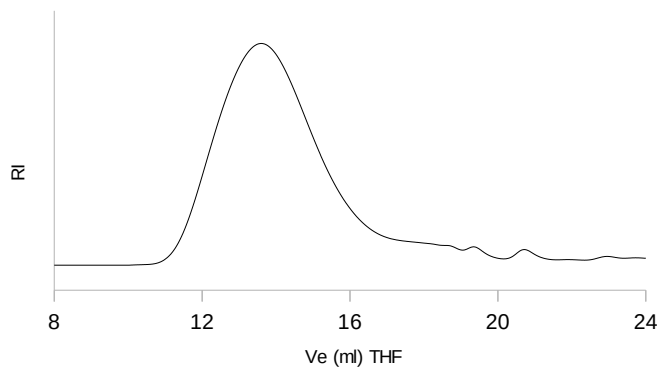
Column: AppliChrom StyDiV-Be-P-1500A-BPT  
Dimension: 2x 300mm x 8mm  
1x 50mmx 8mm  
Mobil Phase: THF  
Flow: 0.5ml/min  
Temperature: 45°C  
Detection: RI  
Injection: 20µl sample

High resolution



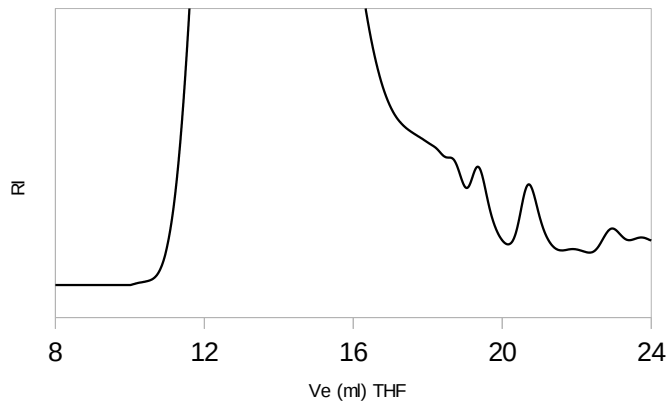
**Analyte: PVC**

Column: AppliChrom StyDiV-Be-P-10E5A-BPT  
Dimension: 2x 300mm x 8mm  
Mobil Phase: THF  
Flow: 1.0ml/min  
Temperature: 45°C  
Detection: RI  
Injection: 20µl sample



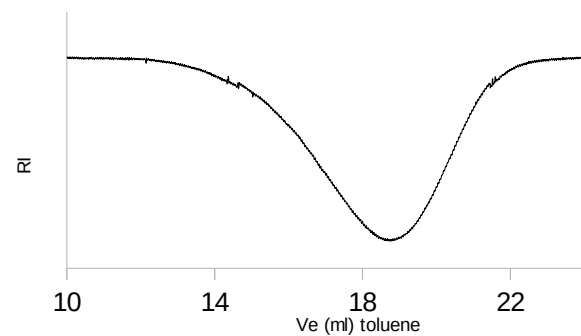
**Analyte: PMMA**

Column: AppliChrom StyDiV-Be-P-10E5A-BPT  
Dimension: 2x 300mm x 8mm  
Mobil Phase: THF  
Flow: 1.0ml/min  
Temperature: 45°C  
Detection: RI  
Injection: 20µl sample



**Analyte: PMMA enlarged**

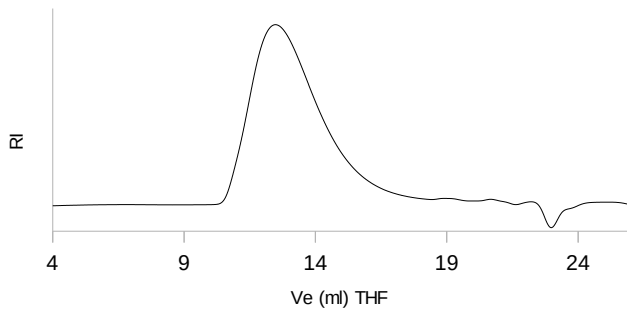
Column: AppliChrom StyDiV-Be-P-10E5A-BPT  
Dimension: 2x 300mm x 8mm  
Mobil Phase: THF  
Flow: 1.0ml/min  
Temperature: 45°C  
Detection: RI  
Injection: 20µl sample



**Analyte: Silicone**

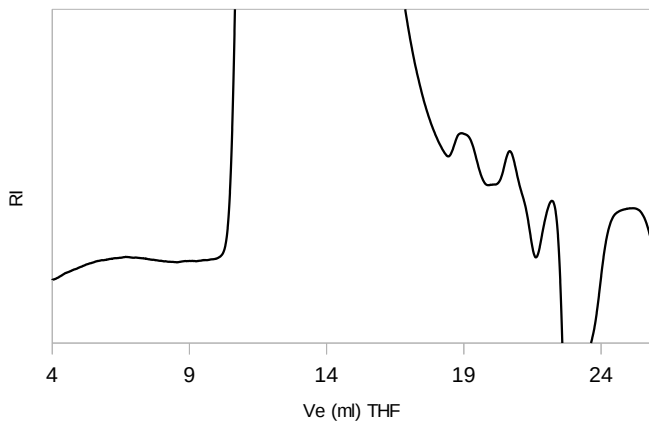
Column: AppliChrom StyDiV-Be-P-10E5A-BPT  
Dimension: 2x 300mm x 8mm  
Mobil Phase: Toluene  
Flow: 1.0ml/min  
Temperature: 20°C  
Detection: RI  
Injection: 20µl sample

Broad calibration range, no porosity artefacts observed



**Analyte: Polystyrene**

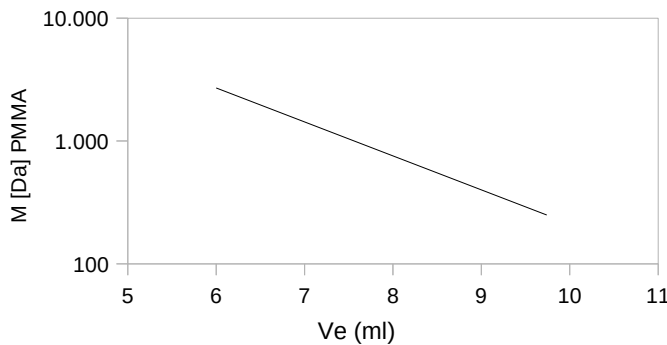
Column: AppliChrom StyDiViBe-P-10E5A-BPT  
Dimension: 2x 300mm x 8mm  
Mobil Phase: THF  
Flow: 1.0ml/min  
Temperature: 45°C  
Detection: RI  
Injection: 20µl sample



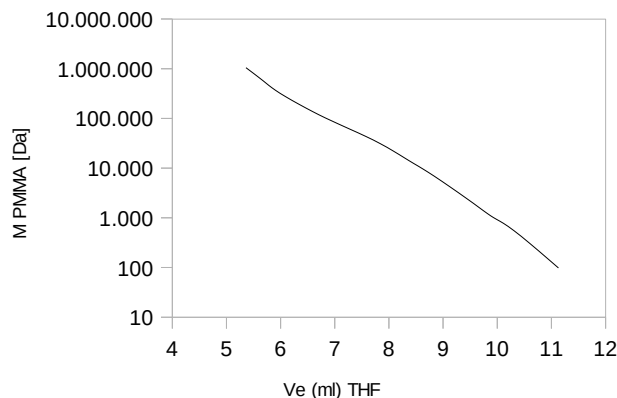
**Analyte: Polystyrene enlarged**

Column: AppliChrom StyDiViBe-P-10E5A-BPT  
Dimension: 2x 300mm x 8mm  
Mobil Phase: THF  
Flow: 1.0ml/min  
Temperature: 45°C  
Detection: RI  
Injection: 20µl sample

Ve [ml] vs M PMMA [Da]



Ve vs. M (PMMA)



**GPC calibration curve**

Column: AppliChrom StyDiViBe-P-35A  
Dimension: 300mm x 8mm  
Mobil Phase: THF  
Flow: 1.0ml/min  
Temperature: 45°C  
Detection: RI  
Injection: 20µl sample

GPC calibration curve, large pore volume plus low exclusion limit for high oligomer resolution even with low backpressure.

**GPC calibration curve**

Column: AppliChrom StyDiViBe-P-10E5A-BPT  
Dimension: 2x 300mm x 8mm  
Mobil Phase: THF  
Flow: 1.0ml/min  
Temperature: 20°C  
Detection: RI  
Injection: 20µl sample

AppliChrom StDiViBe 10E5A BPT-Technology: Large calibration range respective good to calculate calibration curve from monomer up to 1 500 000Dalton, ideal technological step ahead if a combination of porosities results in „artificial shoulders“ of calibration curves and/or in artificial shoulders of broad distributed molecular weight polymers. An easy to use tool to improve quality of results for your analytes.



# AppliChrom StyDiViBe-P

Catalog #	Description	Dimension	Separation Range
ASDVBP352508 ASDVBP353008 ASDVBP35508 ASDVBP35308	AppliChrom StyDiViBe-P-35A	250mm x 8mm 300mm x 8mm 50mm x 8mm 30mm x 8mm	100Da-2 500Da
ASDVBP1002508 ASDVBP1003008 ASDVBP100508 ASDVBP100308	AppliChrom StyDiViBe-P-100A	250mm x 8mm 300mm x 8mm 50mm x 8mm 30mm x 8mm	100Da-10 000Da
ASDVBP5002508 ASDVBP5003008 ASDVBP500508 ASDVBP500308	AppliChrom StyDiViBe-P-500A	250mm x 8mm 300mm x 8mm 50mm x 8mm 30mm x 8mm	100Da-30 000Da
ASDVBP10002508 ASDVBP10003008 ASDVBP1000508 ASDVBP1000308	AppliChrom StyDiViBe-P-1000A	250mm x 8mm 300mm x 8mm 50mm x 8mm 30mm x 8mm	100Da-70 000Da
ASDVBP15002508 ASDVBP15003008 ASDVBP1500508 ASDVBP1500308	AppliChrom StyDiViBe-P-1500A	250mm x 8mm 300mm x 8mm 50mm x 8mm 30mm x 8mm	100Da-120 000Da
ASDVBP40002508 ASDVBP40003008 ASDVBP4000508 ASDVBP4000308	AppliChrom StyDiViBe-P-4000A	250mm x 8mm 300mm x 8mm 50mm x 8mm 30mm x 8mm	100Da-400 000Da
ASDVBP100002508 ASDVBP100003008 ASDVBP10000508 ASDVBP10000308	AppliChrom StyDiViBe-P-10000A	250mm x 8mm 300mm x 8mm 50mm x 8mm 30mm x 8mm	500Da-1 500 000Da
ASDVBP1000002508 ASDVBP1000003008 ASDVBP100000508 ASDVBP100000308	AppliChrom StyDiViBe-P-100000A	250mm x 8mm 300mm x 8mm 50mm x 8mm 30mm x 8mm	10 000Da – 4 000 000Da
ASDVBP10000002508 ASDVBP10000003008 ASDVBP1000000508 ASDVBP1000000308	AppliChrom StyDiViBe-P-1000000A	250mm x 8mm 300mm x 8mm 50mm x 8mm 30mm x 8mm	100 000Da – 10 000 000Da



Runge picture „homemade“

# Inquiry Form For Forwarding to AppliChrom GmbH

To place an order please fill in this form and send it by mail or fax to:

AppliChrom GmbH  
Germendorfer Allee 20  
D-16515 Oranienburg  
Germany

Telephone: +49 (0)3301 579293  
Fax: +49 (0)3301 209879  
Email: info@applichrom.co  
Web: www.applichrom.com

Catalog	Description	Dimension

bulk quantities on request

address

name

company / institute

address

country

telephone number

e-mail

VAT-number

comment