

GPC Analysis of [REDACTED]

March 6th 2020

1. Name and address of test laboratory

Laboratory: [REDACTED]

Address: [REDACTED]

Telephone: [REDACTED]

2. Study in charge

Study director [REDACTED]

Person in charge of study [REDACTED]

Study director [REDACTED]

Date

March 6th 2020

3. Test substance

(1) Sample name [REDACTED]

(2) Purity [REDACTED] %

(3) Lot No. 033301

(4) Chemical name: 1-Propanethiol, 3-(triethoxysilyl)-, reaction products with polybutadiene

(5) CAS No.: 2109699-92-3

4. Condition of equipment

(1) Equipment: GPC HLC-8320 EcoSEC: Tosoh Corporation

(2) Detector: Built in Refractive Index Detector

(3) Solvent: Tetrahydrofuran

(4) Column: Manufacturer: Tosoh Corporation

Type: TSKgel Super HZ4000 x2, HZ-L (Guard column)

(5) Temperature: 40 deg.C

(6) Flow rate: 0.35 mL/min

(7) Injection volume and

sample concentration: 10 µL, 5 mg/10mL

(8) Data system: EcoSEC-WorkStation: Tosoh Corporation

5. Calibration of the system

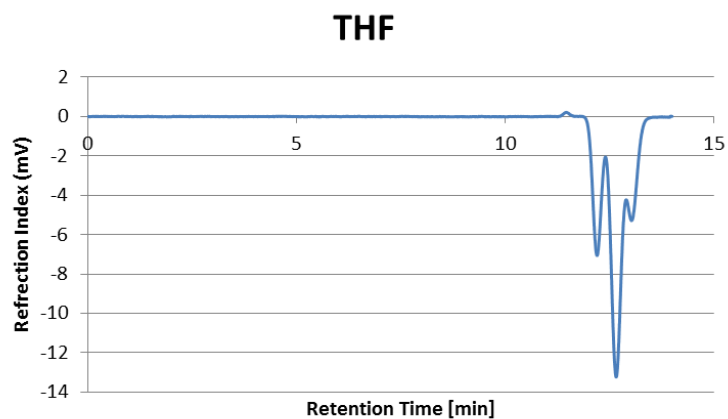
(1) Standard substance and manufacturer

No.	standard substance	manufacturer
1	Polystyrene F-80	Tosoh Corporation
2	Polystyrene F-40	Tosoh Corporation
3	Polystyrene F-20	Tosoh Corporation
4	Polystyrene F-10	Tosoh Corporation
5	Polystyrene F-4	Tosoh Corporation
6	Polystyrene F-2	Tosoh Corporation
7	Polystyrene F-1	Tosoh Corporation
8	Polystyrene A-5000	Tosoh Corporation
9	Polystyrene A-2500	Tosoh Corporation
10	Polystyrene A-1000	Tosoh Corporation

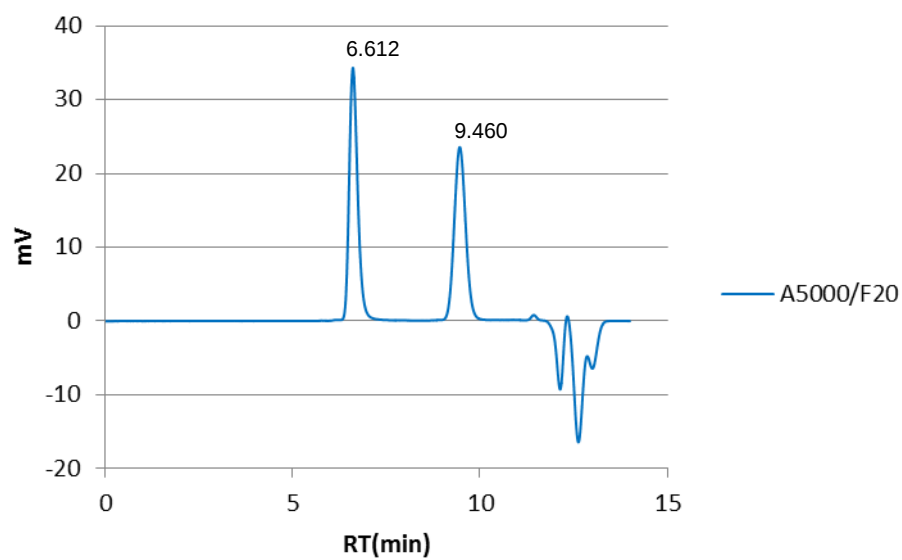
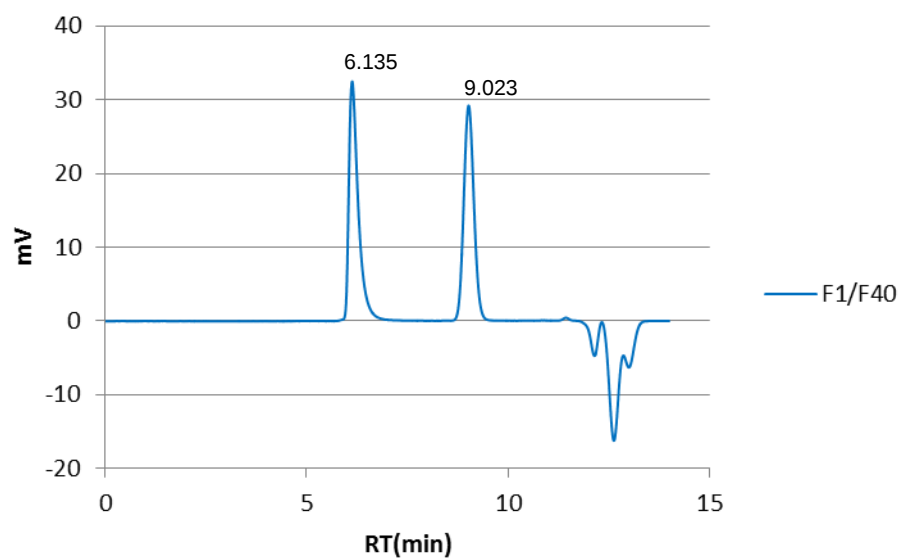
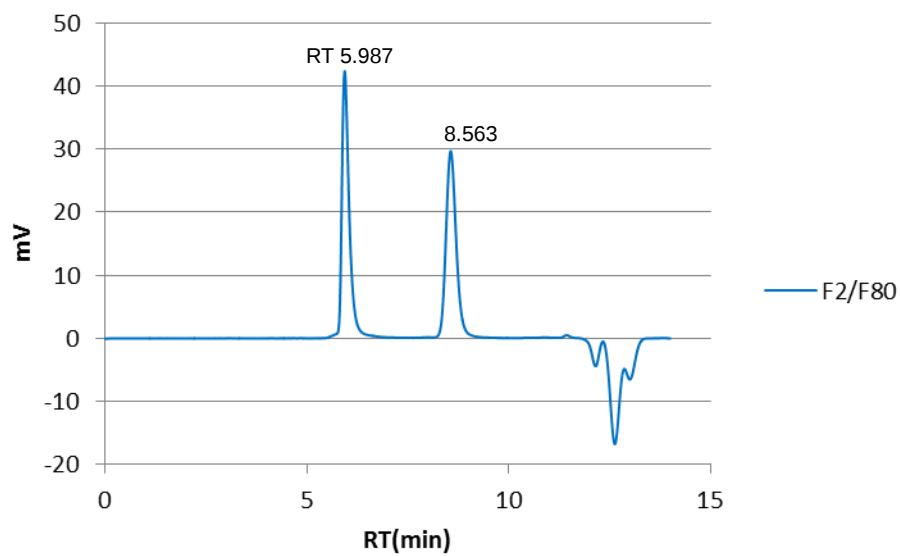
(2) Standard substance Molecular weight, injection rate and injection concentration

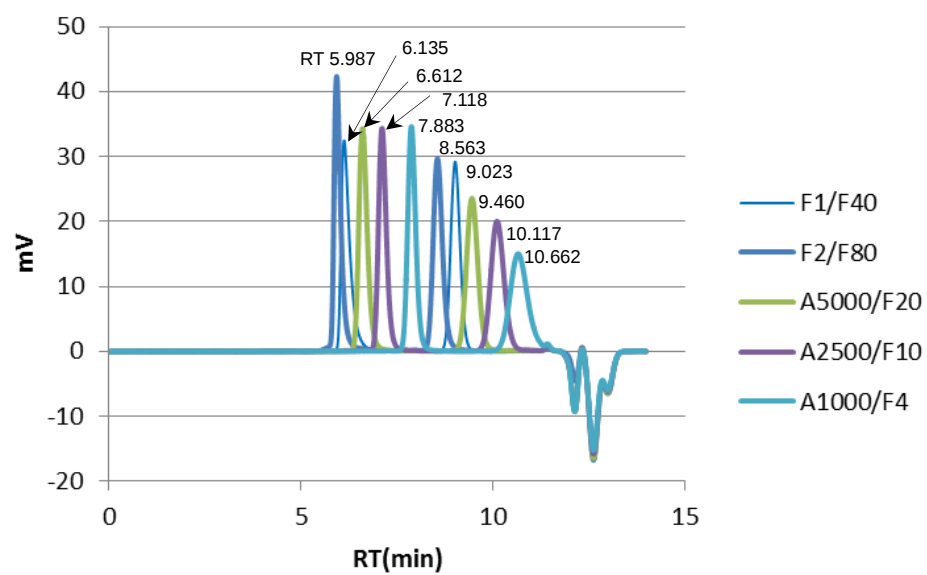
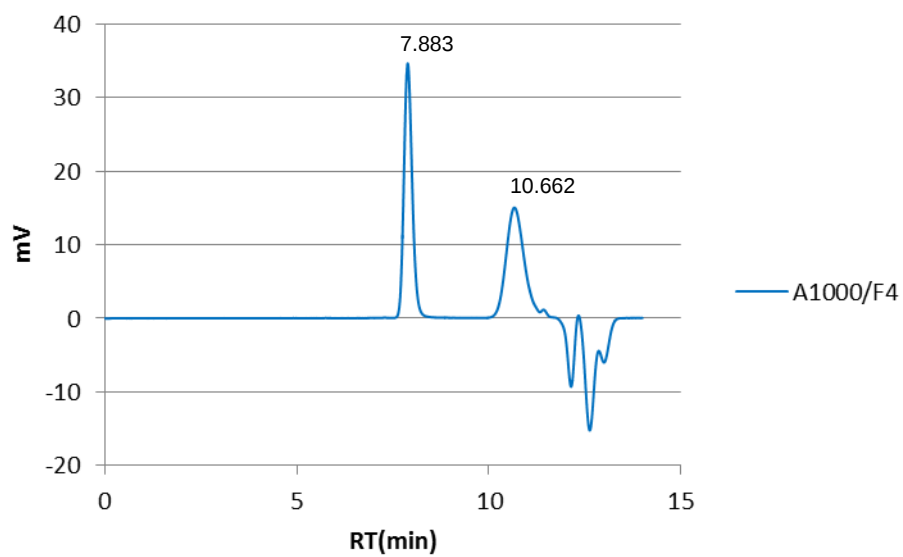
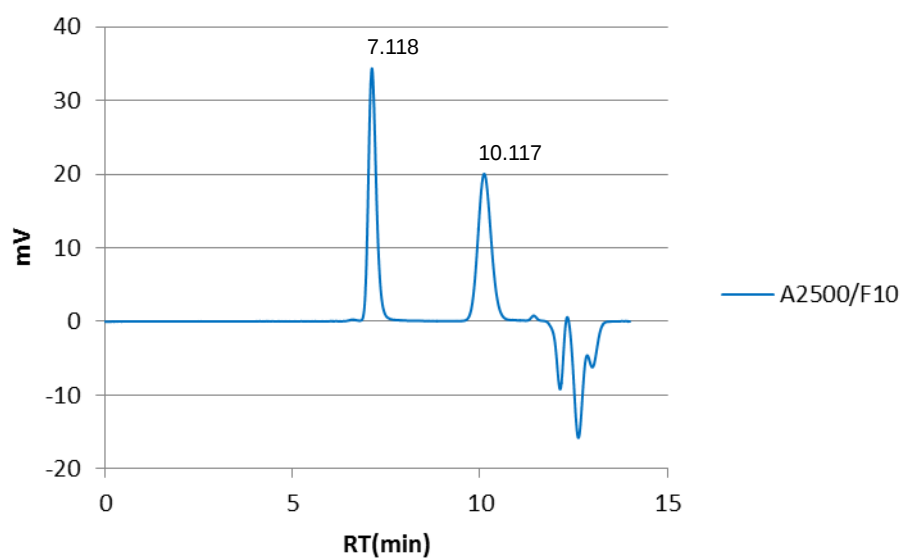
No.	Molecular weight	injection rate	injection concentration
	Mp		
1	7.06×10^5	10 μL	1.05 mg/mL
2	4.27×10^5	10 μL	1.02 mg/mL
3	1.90×10^5	10 μL	1.04 mg/mL
4	9.64×10^4	10 μL	1.01 mg/mL
5	3.79×10^4	10 μL	1.01 mg/mL
6	1.74×10^4	10 μL	1.01 mg/mL
7	1.02×10^4	10 μL	1.02 mg/mL
8	5.56×10^3	10 μL	1.02 mg/mL
9	2.63×10^3	10 μL	1.11 mg/mL
10	10.1×10^2	10 μL	1.13 mg/mL

(3) GPC chromatograms of blank

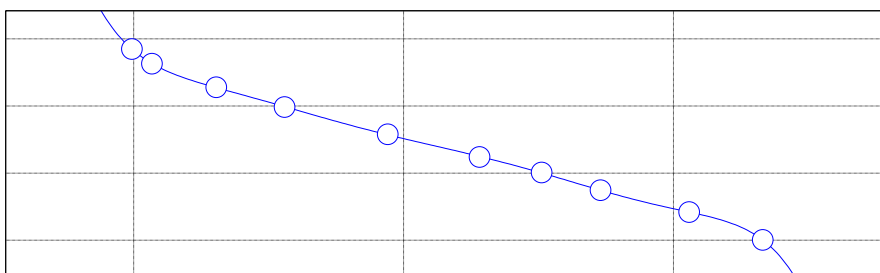


(4) GPC chromatograms of polystyrene standards





(5) Calibration Curve

r_s

<Calibration data> (RI)

Time [min]	M	Error [%]	Weight	Mark	Coefficient	
5.987	706,000	0.33812	1	Standard	A =	-4.389279e-003
6.135	427,000	-0.73834	1	Standard	B =	2.550476e-001
6.612	190,000	1.17238	1	Standard	C =	-6.316067e+000
7.118	96,400	-1.55482	1	Standard	D =	8.641004e+001
7.883	37,900	1.70685	1	Standard	E =	-7.053444e+002
8.563	17,400	-1.96142	1	Standard	F =	3.435391e+003
9.023	10,200	1.18785	1	Standard	G =	-9.245357e+003
9.460	5,560	-0.14682	1	Standard	H =	1.061381e+004
10.117	2,630	-0.09333	1	Standard		
10.662	1,010	0.02636	1	Standard	Correlation coefficient	-0.998

Calibration formula: $At^7+Bt^6+Ct^5+Dt^4+Et^3+Et^2+Gt+H$

Correction: No

6. Test results

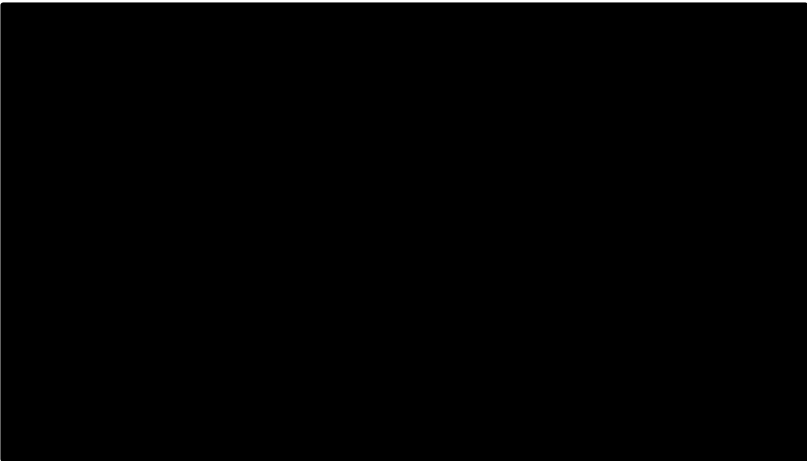
Test results for this product

Molecular weights are relative values equivalent to the molecular weights of Polystyrene standards.

Test Parameters	Value (Da)
Number Average Molecular Weight (Mn)	■■■■
Weight Average Molecular Weight (Mw)	■■■■
Polydispersity (Mw/Mn)	■■■■
Peak Molecular Weight (Mp)	■■■■

Test Parameters	Value (%)
Molecular fraction < 1000 Da	■■■■
Molecular fraction < 500 Da	■■■■

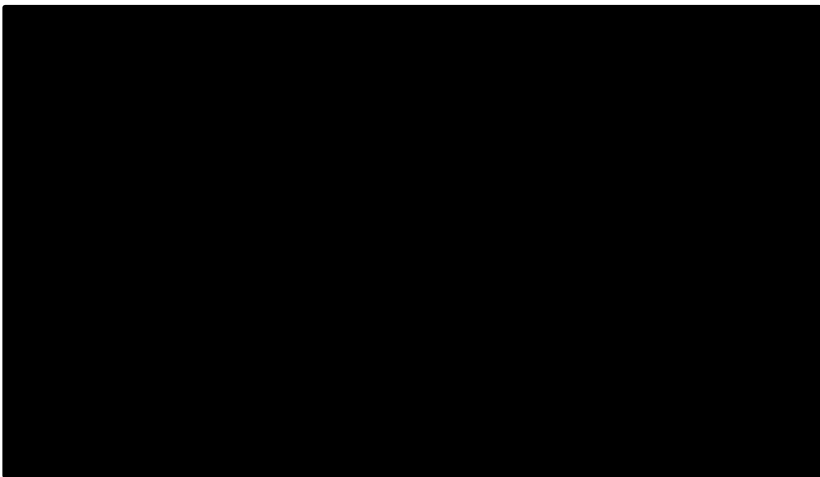
-GPC Chromatogram



<Molecular weight calculation>

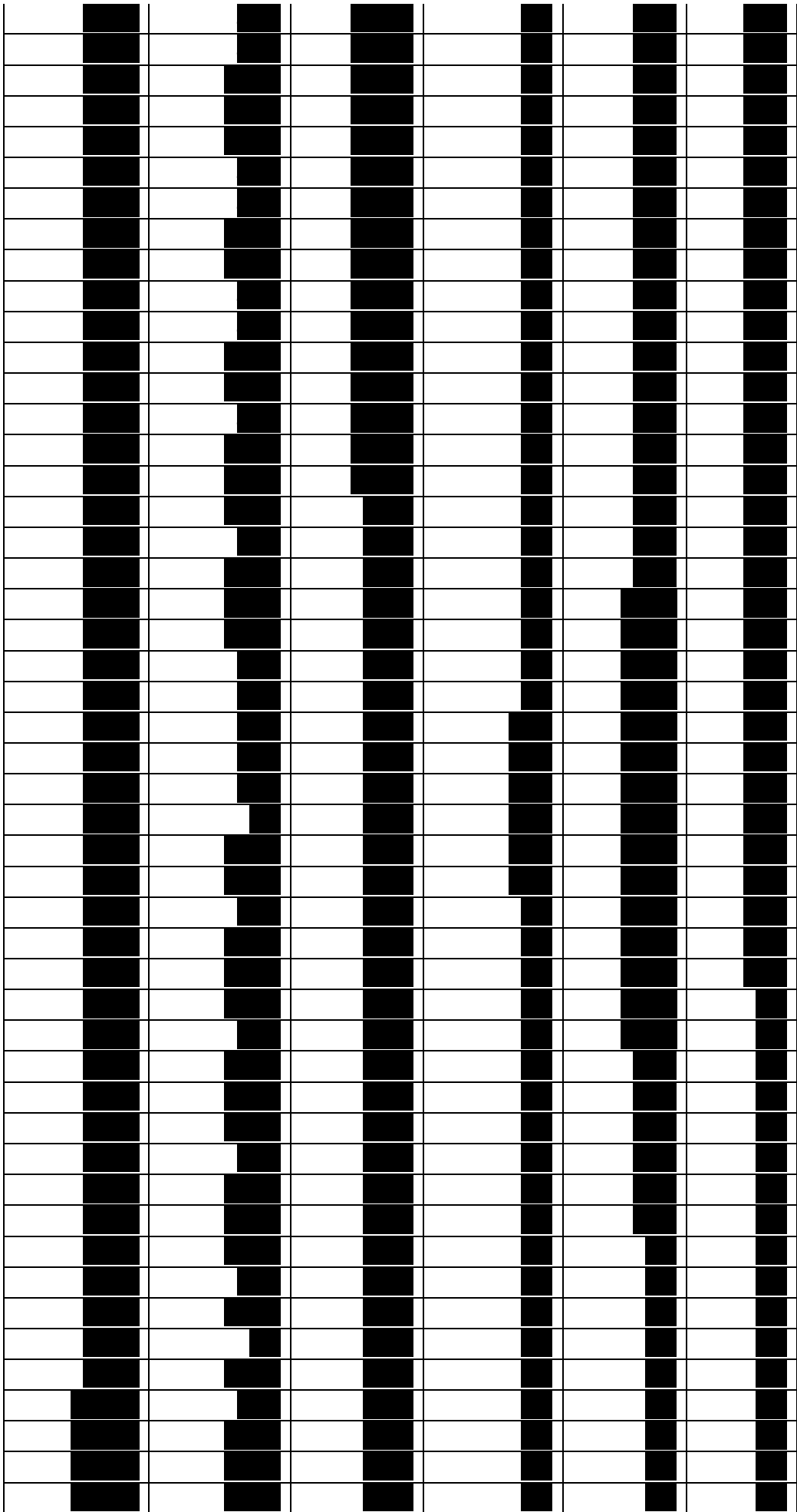
	[min]	[mV]	[mol]	Mn	
Peak Start				Mw	
Peak Top				Mz	
Peak End				Mz+1	
				Mv	
Intensity [mV]				Mp	
Area [mV.sec]				Mz/Mw	
Area% [%]				Mw/Mn	
[η]				Mz+1/Mw	

-GPC cumulative molecular weight distribution



-GPC slice table

[illegible]



[illegible]