

# CERTIFICATE OF ANALYSIS

## ERM<sup>®</sup>-FD122

### Porous glass beads II

Certified Values		
Pressure-volume curve between 0.1 MPa and 400 MPa (see Fig. A1 and A2 in Annex 1 and Table in Annex 2 for values at each data point)		
Diameter-volume curve between 3.7 nm and 14708 nm (see Fig. A3 and A4 in Annex 1 and Table in Annex 2 for values at each data point)		
Quantity	Certified value <sup>1)</sup>	Uncertainty <sup>2)</sup>
Pore volume at 100 MPa in mm <sup>3</sup> ·g <sup>-1</sup>	919.7	± 16.8
Pore volume at 195 MPa in mm <sup>3</sup> ·g <sup>-1</sup>	922.5	± 17.5
Pore volume at 200 MPa in mm <sup>3</sup> ·g <sup>-1</sup>	922.6	± 17.5
Pore volume at 395 MPa in mm <sup>3</sup> ·g <sup>-1</sup>	924.4	± 17.2
Mean pore width d <sub>50</sub> in nm	139.0	± 3.7
Most frequent pore width d <sub>p,m</sub> in nm	140.2	± 3.9
<sup>1)</sup> Unweighted mean value of the means of 24 accepted sets of data, each set being obtained in a different laboratory.		
<sup>2)</sup> Estimated expanded uncertainty U corresponding to a level of confidence > 95 %, as defined in the Guide to the expression of uncertainty in measurement, ISO (1995).		

This certificate is valid for three years after purchase.

## NOTE

European Reference Material ERM<sup>®</sup>-FD122 was originally certified as BAM-PM-122. It was produced and certified under the responsibility of BAM Bundesanstalt für Materialforschung und -prüfung according to the principles laid down in the technical guidelines of the European Reference Materials<sup>®</sup> co-operation agreement between BAM-LGC-IRMM. Information on these guidelines is available on the Internet (<http://www.erm-crm.org>).

Accepted as an ERM<sup>®</sup>, Berlin, 2004-04-14

Sales date:

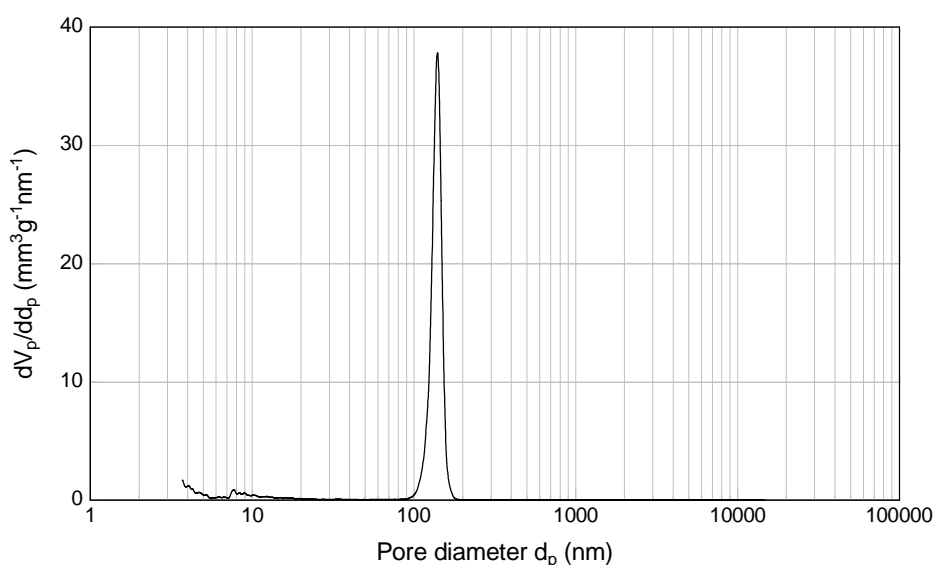
BAM Berlin  
Department I  
Analytical Chemistry;  
Reference Materials  
12200 Berlin, Germany

BAM Berlin  
Division I.1  
Inorganic Chemical Analysis;  
Reference Materials  
12200 Berlin, Germany

Prof. Dr. I. Nehls  
(Head of Department)

Dr. R. Matschat  
(Head of Division)

<b>Additional Material Information</b>	
Quantity	Informative value
Specific surface area <sup>3)</sup> in m <sup>2</sup> g <sup>-1</sup>	26.6
<sup>3)</sup> only as additional information, given without uncertainty, calculated according to $A_{sp} = 4 \cdot V / d$ using the certified properties $V_{200MPa}$ and $d_{50}$ (diameter at 50 % specific pore volume)	



**Figure 1:** Pore size distribution of ERM<sup>®</sup>-FD122 (non-certified)

## DESCRIPTION OF THE SAMPLE

The reference material is intended for use in the calibration and checking of high pressure mercury porosimeters in the pressure range between 0.1 and 400 MPa.

The reference material consists of porous glass beads.

## ANALYTICAL METHOD USED FOR CERTIFICATION

Mercury intrusion according to DIN 66133

## PARTICIPANTS

Co-ordination

BAM Bundesanstalt für Materialforschung und -prüfung, DE

Participants:

- BAM Bundesanstalt für Materialforschung und -prüfung, Berlin, DE (5 equipments in 2 laboratories)
- Degussa AG, Hanau, DE
- Delft University of Technology, Delft, NL
- Dr. C. Otto Feuerfest GmbH, Bochum, DE
- Forschungsinstitut der Zementindustrie Düsseldorf, Düsseldorf, DE
- Forschungsinstitut für anorganische Werkstoffe - Glas/Keramik - GmbH, Höhr-Grenzhausen, DE
- Fraunhofer-Institut für Bauphysik, Valley, DE
- Grace GmbH, Worms, DE
- Hermsdorfer Institut für Technische Keramik e.V., Hermsdorf/Thür., DE
- Hüls Infracor GmbH, Marl, DE
- Materialprüfanstalt für das Bauwesen, Braunschweig, DE
- MBF Gesellschaft für Materialprüfung und Baustoffforschung mbH, Berlin, DE
- Merck KGaA, Darmstadt, DE
- Micromeritics GmbH, Mönchengladbach, DE
- Quantachrome GmbH, Odelzhausen, DE
- Rheinisch-Westfälische Technische Hochschule, Aachen, DE
- Technische Universität Dresden, Dresden, DE
- Technische Universität Hamburg-Harburg, Hamburg, DE
- ThermoQuest Italia S.p.A., CE Instruments, Rodano (Milan), IT
- Universität Gesamthochschule Siegen, Siegen, DE
- Universität Hannover, Hannover, DE
- Universität Karlsruhe, Karlsruhe, DE
- Universiteit van Amsterdam, Amsterdam, NL

## INSTRUCTIONS FOR USE

Use mercury with a purity of 99.9999 % (outgassed) or better.

Prior to the analysis, a heating procedure for drying the sample is necessary. Heat the reference material for 3 hours at 105 °C.

The recommended minimum sample intake is 0.3 g or more depending on the equipment used.

**Because of the volume between the particles of the sample (intergranular volume with a more or less random character), the mercury filling procedure of the penetrometer / dilatometer should be carried out with caution.**

## DATA EVALUATION

In order to obtain the certified values, the intergranular volume recorded during the filling procedure has to be subtracted from the intrusion curve at the beginning of the data evaluation. The transformation of the intrusion pressure data  $p_{Hg}$  into pore diameter values  $d_p$  according to the Washburn equation  $d_p = -4 \gamma \cos\theta / p_{Hg}$  (assuming a cylindrical pore model) has to be carried out using the following values of the parameters:  $\gamma = 0.48 \text{ N m}^{-1}$  (surface tension of mercury) and  $\theta = 140^\circ$  (contact angle of mercury). The most frequent pore diameter is the maximum of the pore size distribution curve  $dV_p/dd_p$  (see Fig. 1)

## STORAGE

The unopened bottle should be stored at normal ambient temperature in a dry place.

## TECHNICAL REPORT

A detailed technical report (in German) describing the analysis procedures and the treatment of the analytical data used to certify ERM<sup>®</sup>-FD122 is available on request.

## REFERENCES

- Guidelines for the production and certification of BAM reference materials  
BCR/48/93 (1994) Guidelines for the production and certification of BCR reference materials  
ASTM D 4284-92 Standard test method for determining pore volume distribution of catalysts by mercury intrusion porosimetry  
BS 7591-1: 1992 Porosity and pore size distribution of materials.  
Method of evaluation by mercury porosimetry  
DIN 66133: 1993 Bestimmung der Porenvolumenverteilung und der spezifischen Oberfläche von Feststoffen durch Quecksilberintrusion  
(Determination of the pore volume distribution and the specific surface area of solids by mercury intrusion)  
ISO/WD 155 901-1 Pore size distribution and porosity of solid materials – Evaluation by mercury porosimetry and gas sorption, Part 1: Mercury porosimetry (WG 3) July 1998

Supply of Reference Materials by BAM Bundesanstalt für Materialforschung und -prüfung:

Richard-Willstätter-Straße 11, 12489 Berlin, Germany

Phone: +49 30 8104 2061

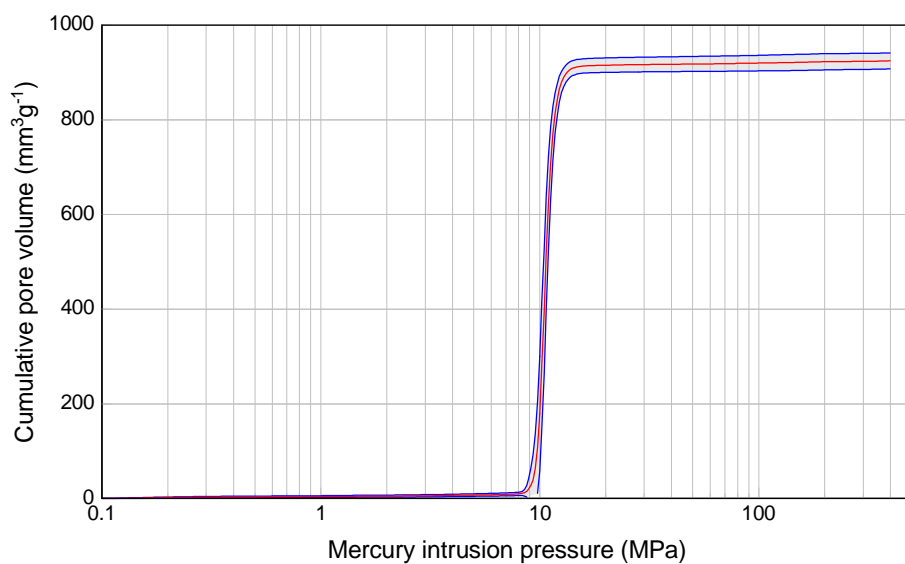
E-mail: [sales.crm@bam.de](mailto:sales.crm@bam.de)

Fax: +49 30 8104 1117

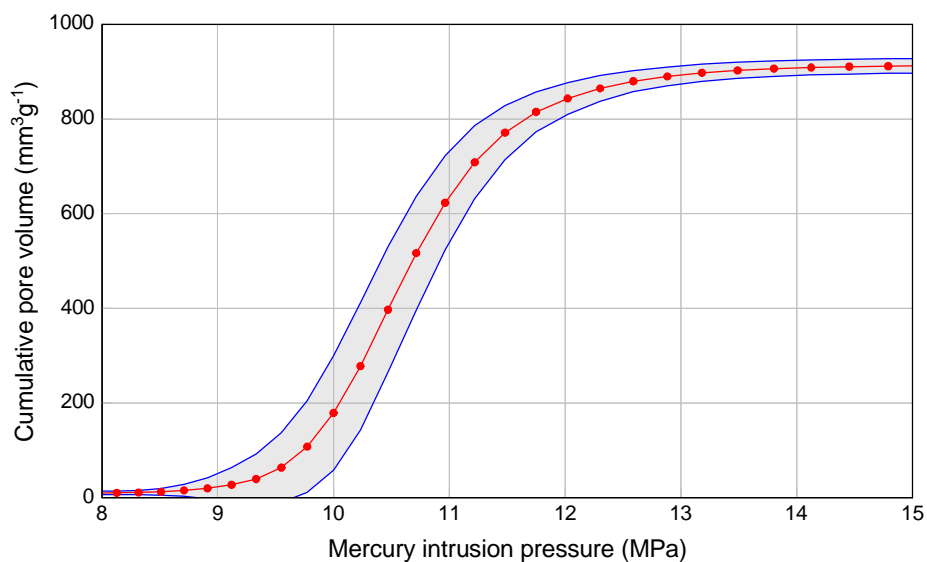
Internet: [www.webshop.bam.de](http://www.webshop.bam.de)

## ANNEX 1

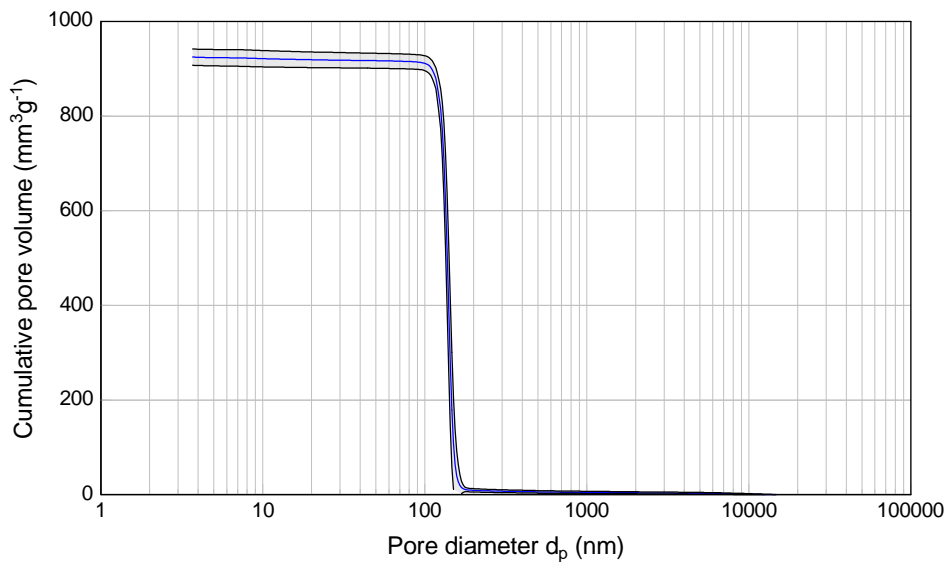
### Graphs of certified pressure-volume and diameter-volume curves for ERM<sup>®</sup>-FD122



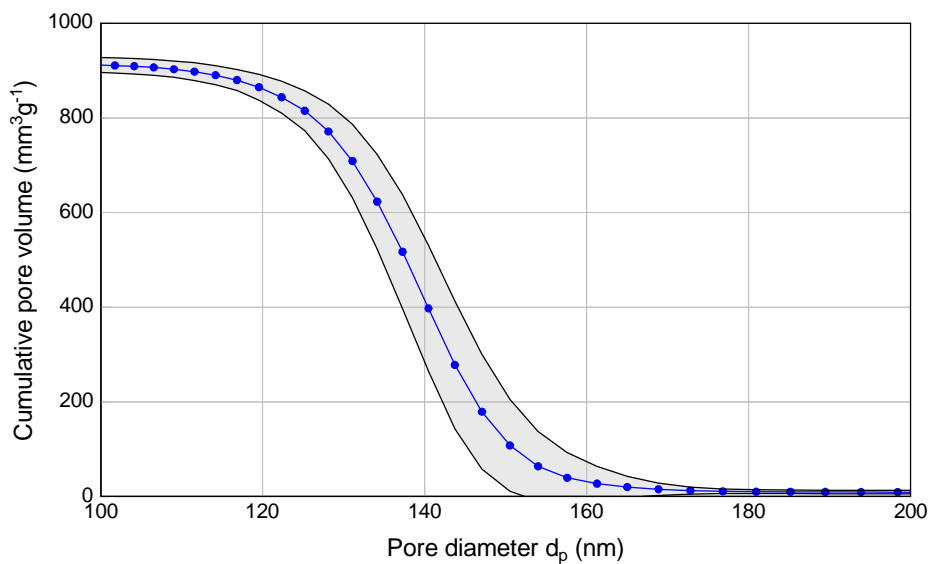
**Figure A1:** Certified pressure-volume curve of material ERM<sup>®</sup>-FD122 with uncertainty interval



**Figure A2:** Certified pressure-volume curve of material ERM<sup>®</sup>-FD122 with uncertainty interval (detail between 8 and 15 MPa)



**Figure A3:** Certified diameter-volume curve of material ERM<sup>®</sup>-FD122 with uncertainty interval



**Figure A4:** Certified diameter-volume curve of material ERM<sup>®</sup>-FD122 with uncertainty interval (detail between 100 and 200 nm)

## ANNEX 2

### Certified values of pressure-volume and diameter-volume curves for ERM<sup>®</sup>-FD122 at each data point

Data point No.	$P_{Hg}$ (MPa)	$d_p$ (nm)	$V_p$ (mm <sup>3</sup> g <sup>-1</sup> )	$U$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_{p+U}$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_{p-U}$ (mm <sup>3</sup> g <sup>-1</sup> )
1	0.100	14708.053	0.000	0.344	0.344	-0.344
2	0.102	14373.299	0.025	0.337	0.362	-0.311
3	0.105	14046.062	0.066	0.342	0.408	-0.275
4	0.107	13726.345	0.113	0.368	0.482	-0.255
5	0.110	13413.882	0.164	0.414	0.578	-0.250
6	0.112	13108.548	0.233	0.490	0.724	-0.257
7	0.115	12810.219	0.310	0.566	0.876	-0.255
8	0.117	12518.558	0.366	0.578	0.944	-0.213
9	0.120	12233.671	0.435	0.598	1.033	-0.163
10	0.123	11955.143	0.508	0.627	1.135	-0.119
11	0.126	11682.979	0.580	0.659	1.239	-0.078
12	0.129	11417.080	0.649	0.694	1.343	-0.045
13	0.132	11157.172	0.724	0.740	1.464	-0.015
14	0.135	10903.254	0.802	0.788	1.590	0.013
15	0.138	10655.076	0.878	0.836	1.714	0.041
16	0.141	10412.486	0.955	0.877	1.832	0.079
17	0.145	10175.485	1.019	0.920	1.939	0.099
18	0.148	9943.854	1.100	0.962	2.062	0.138
19	0.151	9717.522	1.184	1.018	2.202	0.166
20	0.155	9496.296	1.281	1.064	2.344	0.217
21	0.158	9280.173	1.371	1.118	2.489	0.253
22	0.162	9068.913	1.461	1.175	2.636	0.286
23	0.166	8862.462	1.551	1.233	2.784	0.319
24	0.170	8660.762	1.624	1.273	2.898	0.351
25	0.174	8463.605	1.690	1.307	2.997	0.382
26	0.178	8270.943	1.759	1.348	3.106	0.411
27	0.182	8082.680	1.824	1.383	3.206	0.441
28	0.186	7898.680	1.886	1.417	3.303	0.468
29	0.191	7718.899	1.954	1.453	3.407	0.501
30	0.195	7543.210	2.027	1.497	3.523	0.530
31	0.200	7371.497	2.101	1.541	3.643	0.560
32	0.204	7203.686	2.154	1.576	3.730	0.578
33	0.209	7039.704	2.205	1.605	3.810	0.600
34	0.214	6879.480	2.257	1.622	3.879	0.635
35	0.219	6722.882	2.306	1.642	3.948	0.665
36	0.224	6569.849	2.350	1.653	4.004	0.697
37	0.229	6420.292	2.393	1.666	4.059	0.727
38	0.234	6274.151	2.439	1.681	4.120	0.758
39	0.240	6131.345	2.485	1.698	4.183	0.788
40	0.245	5991.768	2.529	1.719	4.248	0.810
41	0.251	5855.373	2.570	1.738	4.308	0.832
42	0.257	5722.087	2.616	1.761	4.377	0.854
43	0.263	5591.842	2.659	1.783	4.443	0.876
44	0.269	5464.570	2.700	1.803	4.503	0.897
45	0.275	5340.169	2.736	1.821	4.557	0.914
46	0.282	5218.620	2.769	1.841	4.611	0.928
47	0.288	5099.827	2.802	1.856	4.658	0.947
48	0.295	4983.737	2.837	1.874	4.711	0.963
49	0.302	4870.297	2.870	1.896	4.767	0.974
50	0.309	4759.426	2.904	1.918	4.822	0.987

$P_{Hg}$  - mercury intrusion pressure  
 $d_p$  - pore diameter  
 $V_p$  - specific pore volume

$U$  - uncertainty  
 $V_{p+U}$  - upper limit of the uncertainty interval  
 $V_{p-U}$  - lower limit of the uncertainty interval

**Certified values of pressure-volume and diameter-volume curves for ERM®-FD122 at each data point**

Data point No.	$p_{Hg}$ (MPa)	$d_p$ (nm)	$V_p$ (mm <sup>3</sup> g <sup>-1</sup> )	$U$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_p+U$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_p-U$ (mm <sup>3</sup> g <sup>-1</sup> )
51	0.316	4651.091	2.940	1.938	4.879	1.002
52	0.324	4545.218	2.972	1.957	4.929	1.015
53	0.331	4441.763	3.004	1.977	4.981	1.026
54	0.339	4340.656	3.039	2.005	5.044	1.033
55	0.347	4241.847	3.074	2.027	5.101	1.047
56	0.355	4145.297	3.108	2.039	5.147	1.070
57	0.363	4050.935	3.143	2.048	5.191	1.094
58	0.372	3958.726	3.174	2.052	5.226	1.121
59	0.380	3868.616	3.203	2.056	5.260	1.147
60	0.389	3780.553	3.230	2.060	5.290	1.170
61	0.398	3694.498	3.261	2.061	5.322	1.200
62	0.407	3610.401	3.289	2.062	5.351	1.228
63	0.417	3528.219	3.313	2.065	5.378	1.249
64	0.427	3447.900	3.338	2.066	5.404	1.272
65	0.437	3369.419	3.358	2.072	5.431	1.286
66	0.447	3292.720	3.378	2.080	5.457	1.298
67	0.457	3217.773	3.399	2.085	5.485	1.314
68	0.468	3144.527	3.420	2.093	5.513	1.327
69	0.479	3072.948	3.443	2.099	5.542	1.345
70	0.490	3002.998	3.468	2.104	5.572	1.363
71	0.501	2934.644	3.495	2.107	5.602	1.388
72	0.513	2867.844	3.520	2.111	5.631	1.410
73	0.525	2802.564	3.546	2.115	5.661	1.432
74	0.537	2738.767	3.573	2.119	5.692	1.454
75	0.550	2676.425	3.601	2.125	5.725	1.476
76	0.562	2615.504	3.631	2.126	5.757	1.504
77	0.575	2555.966	3.661	2.127	5.787	1.534
78	0.589	2497.784	3.689	2.129	5.818	1.560
79	0.603	2440.928	3.717	2.131	5.848	1.587
80	0.617	2385.367	3.742	2.134	5.876	1.607
81	0.631	2331.071	3.765	2.139	5.904	1.626
82	0.646	2278.009	3.790	2.142	5.932	1.647
83	0.661	2226.155	3.815	2.146	5.961	1.668
84	0.676	2175.480	3.843	2.147	5.990	1.697
85	0.692	2125.960	3.869	2.151	6.021	1.718
86	0.708	2077.567	3.896	2.157	6.053	1.739
87	0.724	2030.276	3.927	2.160	6.087	1.767
88	0.741	1984.062	3.955	2.166	6.121	1.789
89	0.759	1938.898	3.982	2.170	6.153	1.812
90	0.776	1894.765	4.011	2.174	6.185	1.836
91	0.794	1851.635	4.041	2.176	6.217	1.865
92	0.813	1809.485	4.069	2.179	6.248	1.890
93	0.832	1768.296	4.097	2.179	6.276	1.918
94	0.851	1728.046	4.126	2.179	6.305	1.947
95	0.871	1688.710	4.154	2.182	6.336	1.971
96	0.891	1650.271	4.182	2.187	6.369	1.995
97	0.912	1612.706	4.208	2.194	6.403	2.014
98	0.933	1575.997	4.237	2.203	6.440	2.034
99	0.955	1540.122	4.267	2.210	6.476	2.057
100	0.977	1505.065	4.293	2.217	6.510	2.076

$p_{Hg}$  - mercury intrusion pressure  
 $d_p$  - pore diameter  
 $V_p$  - specific pore volume

$U$  - uncertainty  
 $V_p+U$  - upper limit of the uncertainty interval  
 $V_p-U$  - lower limit of the uncertainty interval



**Certified values of pressure-volume and diameter-volume curves for ERM<sup>®</sup>-FD122 at each data point**

Data point No.	$p_{Hg}$ (MPa)	$d_p$ (nm)	$V_p$ (mm <sup>3</sup> g <sup>-1</sup> )	$U$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_p+U$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_p-U$ (mm <sup>3</sup> g <sup>-1</sup> )
101	1.000	1470.805	4.317	2.225	6.542	2.092
102	1.023	1437.330	4.343	2.231	6.574	2.112
103	1.047	1404.606	4.365	2.242	6.607	2.124
104	1.072	1372.635	4.386	2.255	6.641	2.132
105	1.096	1341.388	4.405	2.271	6.676	2.134
106	1.122	1310.855	4.423	2.292	6.714	2.131
107	1.148	1281.022	4.443	2.312	6.755	2.131
108	1.175	1251.856	4.462	2.337	6.799	2.125
109	1.202	1223.367	4.483	2.364	6.847	2.118
110	1.230	1195.514	4.504	2.387	6.891	2.116
111	1.259	1168.298	4.531	2.405	6.937	2.126
112	1.288	1141.708	4.568	2.411	6.979	2.158
113	1.318	1115.717	4.607	2.413	7.020	2.194
114	1.349	1090.325	4.643	2.416	7.059	2.227
115	1.380	1065.508	4.682	2.413	7.095	2.268
116	1.413	1041.249	4.716	2.419	7.135	2.296
117	1.445	1017.549	4.751	2.424	7.175	2.328
118	1.479	994.385	4.787	2.428	7.215	2.358
119	1.514	971.752	4.822	2.432	7.254	2.391
120	1.549	949.630	4.856	2.432	7.288	2.424
121	1.585	928.017	4.892	2.428	7.321	2.464
122	1.622	906.891	4.926	2.427	7.353	2.498
123	1.660	886.246	4.961	2.424	7.386	2.537
124	1.698	866.076	4.993	2.428	7.421	2.564
125	1.738	846.361	5.024	2.436	7.459	2.588
126	1.778	827.094	5.054	2.448	7.502	2.606
127	1.820	808.268	5.084	2.461	7.545	2.623
128	1.862	789.868	5.117	2.471	7.588	2.646
129	1.905	771.890	5.148	2.479	7.627	2.669
130	1.950	754.321	5.177	2.488	7.665	2.690
131	1.995	737.150	5.209	2.494	7.703	2.715
132	2.042	720.369	5.243	2.500	7.743	2.742
133	2.089	703.970	5.276	2.508	7.784	2.768
134	2.138	687.948	5.315	2.516	7.831	2.799
135	2.188	672.288	5.357	2.527	7.884	2.830
136	2.239	656.985	5.400	2.536	7.936	2.864
137	2.291	642.029	5.442	2.548	7.990	2.893
138	2.344	627.415	5.483	2.563	8.046	2.920
139	2.399	613.134	5.531	2.573	8.103	2.958
140	2.455	599.177	5.580	2.578	8.158	3.002
141	2.512	585.537	5.628	2.587	8.215	3.041
142	2.570	572.209	5.676	2.594	8.270	3.083
143	2.630	559.184	5.721	2.605	8.326	3.116
144	2.692	546.457	5.768	2.617	8.386	3.151
145	2.754	534.017	5.819	2.633	8.453	3.186
146	2.818	521.862	5.869	2.649	8.518	3.220
147	2.884	509.983	5.921	2.661	8.582	3.260
148	2.951	498.374	5.974	2.673	8.646	3.301
149	3.020	487.030	6.030	2.680	8.710	3.351
150	3.090	475.943	6.088	2.688	8.776	3.400

$p_{Hg}$  - mercury intrusion pressure  
 $d_p$  - pore diameter  
 $V_p$  - specific pore volume

$U$  - uncertainty  
 $V_p+U$  - upper limit of the uncertainty interval  
 $V_p-U$  - lower limit of the uncertainty interval

**Certified values of pressure-volume and diameter-volume curves for ERM®-FD122 at each data point**

Data point No.	$p_{Hg}$ (MPa)	$d_p$ (nm)	$V_p$ (mm <sup>3</sup> g <sup>-1</sup> )	$U$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_p+U$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_p-U$ (mm <sup>3</sup> g <sup>-1</sup> )
151	3.162	465.109	6.136	2.701	8.837	3.435
152	3.236	454.522	6.185	2.712	8.897	3.472
153	3.311	444.176	6.234	2.721	8.955	3.512
154	3.388	434.066	6.298	2.724	9.022	3.574
155	3.467	424.185	6.354	2.737	9.091	3.617
156	3.548	414.530	6.410	2.753	9.163	3.657
157	3.631	405.093	6.476	2.770	9.245	3.706
158	3.715	395.873	6.540	2.789	9.329	3.751
159	3.802	386.862	6.607	2.799	9.406	3.808
160	3.890	378.055	6.668	2.819	9.486	3.849
161	3.981	369.450	6.726	2.845	9.571	3.881
162	4.074	361.040	6.787	2.867	9.654	3.920
163	4.169	352.822	6.843	2.893	9.736	3.950
164	4.266	344.790	6.906	2.918	9.824	3.988
165	4.365	336.942	6.968	2.943	9.910	4.025
166	4.467	329.272	7.035	2.956	9.992	4.079
167	4.571	321.777	7.101	2.965	10.066	4.135
168	4.677	314.453	7.168	2.978	10.146	4.190
169	4.786	307.295	7.253	3.000	10.253	4.253
170	4.898	300.300	7.343	3.017	10.360	4.326
171	5.012	293.464	7.434	3.035	10.469	4.398
172	5.129	286.784	7.513	3.063	10.576	4.450
173	5.248	280.256	7.587	3.105	10.692	4.483
174	5.370	273.877	7.676	3.148	10.824	4.528
175	5.495	267.643	7.777	3.168	10.945	4.609
176	5.623	261.550	7.876	3.193	11.069	4.683
177	5.754	255.597	7.974	3.227	11.201	4.746
178	5.888	249.778	8.071	3.261	11.332	4.810
179	6.026	244.093	8.170	3.292	11.463	4.878
180	6.166	238.537	8.280	3.313	11.593	4.967
181	6.310	233.107	8.385	3.329	11.714	5.056
182	6.457	227.801	8.491	3.351	11.842	5.140
183	6.607	222.616	8.622	3.381	12.004	5.241
184	6.761	217.548	8.756	3.422	12.178	5.335
185	6.918	212.596	8.865	3.466	12.332	5.399
186	7.079	207.757	8.972	3.500	12.473	5.472
187	7.244	203.028	9.094	3.547	12.641	5.547
188	7.413	198.406	9.245	3.601	12.845	5.644
189	7.586	193.890	9.405	3.661	13.066	5.744
190	7.762	189.476	9.627	3.703	13.330	5.923
191	7.943	185.163	9.910	3.801	13.711	6.109
192	8.128	180.948	10.315	4.041	14.356	6.274
193	8.318	176.830	11.063	4.895	15.957	6.168
194	8.511	172.805	12.565	7.465	20.030	5.099
195	8.710	168.871	15.401	13.064	28.464	2.337
196	8.913	165.027	19.935	22.580	42.515	-2.645
197	9.120	161.271	27.246	36.697	63.943	-9.451
198	9.333	157.600	39.598	53.618	93.216	-14.020
199	9.550	154.012	63.621	73.879	137.500	-10.258
200	9.772	150.507	107.900	97.087	204.987	10.813

$p_{Hg}$  - mercury intrusion pressure  
 $d_p$  - pore diameter  
 $V_p$  - specific pore volume

$U$  - uncertainty  
 $V_p+U$  - upper limit of the uncertainty interval  
 $V_p-U$  - lower limit of the uncertainty interval

**Certified values of pressure-volume and diameter-volume curves for ERM®-FD122 at each data point**

Data point No.	$p_{Hg}$ (MPa)	$d_p$ (nm)	$V_p$ (mm <sup>3</sup> g <sup>-1</sup> )	$U$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_p+U$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_p-U$ (mm <sup>3</sup> g <sup>-1</sup> )
201	10.000	147.081	179.172	121.164	300.337	58.008
202	10.233	143.733	277.943	134.990	412.934	142.953
203	10.471	140.461	397.252	133.038	530.291	264.214
204	10.715	137.263	516.923	120.523	637.447	396.400
205	10.965	134.139	623.058	99.661	722.720	523.397
206	11.220	131.085	708.656	77.560	786.216	631.096
207	11.482	128.102	771.241	57.514	828.756	713.727
208	11.749	125.186	815.007	42.166	857.173	772.841
209	12.023	122.337	843.422	33.917	877.340	809.505
210	12.303	119.551	864.551	27.460	892.011	837.091
211	12.589	116.830	879.743	22.548	902.291	857.196
212	12.882	114.171	889.921	20.167	910.088	869.754
213	13.183	111.572	897.572	18.430	916.003	879.142
214	13.490	109.033	902.674	17.447	920.121	885.227
215	13.804	106.551	906.498	16.652	923.150	889.846
216	14.125	104.125	908.926	16.192	925.118	892.735
217	14.454	101.755	910.578	15.887	926.465	894.692
218	14.791	99.439	911.764	15.700	927.464	896.065
219	15.136	97.175	912.533	15.522	928.055	897.012
220	15.488	94.963	913.119	15.481	928.600	897.638
221	15.849	92.802	913.609	15.447	929.056	898.163
222	16.218	90.689	913.892	15.462	929.354	898.431
223	16.596	88.625	914.110	15.466	929.576	898.644
224	16.982	86.608	914.309	15.492	929.801	898.817
225	17.378	84.636	914.485	15.523	930.008	898.962
226	17.783	82.709	914.650	15.560	930.211	899.090
227	18.197	80.827	914.796	15.581	930.377	899.215
228	18.621	78.987	914.929	15.583	930.513	899.346
229	19.055	77.189	915.060	15.584	930.644	899.477
230	19.498	75.432	915.196	15.586	930.782	899.610
231	19.953	73.715	915.321	15.598	930.919	899.724
232	20.417	72.037	915.407	15.633	931.040	899.774
233	20.893	70.397	915.500	15.665	931.165	899.835
234	21.380	68.795	915.583	15.683	931.266	899.900
235	21.878	67.229	915.669	15.694	931.363	899.976
236	22.387	65.698	915.759	15.703	931.462	900.056
237	22.909	64.203	915.853	15.712	931.565	900.142
238	23.442	62.742	915.932	15.728	931.660	900.205
239	23.988	61.313	916.022	15.740	931.762	900.282
240	24.547	59.918	916.094	15.758	931.852	900.337
241	25.119	58.554	916.171	15.784	931.955	900.388
242	25.704	57.221	916.251	15.812	932.063	900.440
243	26.303	55.918	916.319	15.836	932.155	900.483
244	26.915	54.646	916.387	15.846	932.233	900.542
245	27.542	53.402	916.454	15.853	932.307	900.601
246	28.184	52.186	916.511	15.863	932.374	900.648
247	28.840	50.998	916.567	15.872	932.439	900.695
248	29.512	49.837	916.622	15.882	932.504	900.740
249	30.200	48.703	916.682	15.895	932.577	900.787
250	30.903	47.594	916.734	15.901	932.635	900.833

$p_{Hg}$  - mercury intrusion pressure  
 $d_p$  - pore diameter  
 $V_p$  - specific pore volume

$U$  - uncertainty  
 $V_p+U$  - upper limit of the uncertainty interval  
 $V_p-U$  - lower limit of the uncertainty interval

**Certified values of pressure-volume and diameter-volume curves for ERM®-FD122 at each data point**

Data point No.	$p_{Hg}$ (MPa)	$d_p$ (nm)	$V_p$ (mm <sup>3</sup> g <sup>-1</sup> )	$U$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_p+U$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_p-U$ (mm <sup>3</sup> g <sup>-1</sup> )
251	31.623	46.511	916.782	15.911	932.694	900.871
252	32.359	45.452	916.829	15.929	932.759	900.900
253	33.113	44.418	916.883	15.959	932.843	900.924
254	33.884	43.407	916.953	16.001	932.954	900.952
255	34.674	42.418	917.006	16.028	933.034	900.978
256	35.481	41.453	917.062	16.036	933.098	901.027
257	36.308	40.509	917.137	16.043	933.180	901.094
258	37.154	39.587	917.196	16.054	933.250	901.143
259	38.019	38.686	917.250	16.068	933.318	901.182
260	38.904	37.806	917.299	16.084	933.384	901.215
261	39.811	36.945	917.353	16.102	933.455	901.251
262	40.738	36.104	917.405	16.118	933.523	901.287
263	41.687	35.282	917.464	16.128	933.592	901.336
264	42.658	34.479	917.539	16.158	933.697	901.381
265	43.652	33.694	917.605	16.185	933.791	901.420
266	44.668	32.927	917.680	16.204	933.885	901.476
267	45.709	32.178	917.740	16.220	933.961	901.520
268	46.774	31.445	917.787	16.231	934.018	901.557
269	47.863	30.729	917.839	16.240	934.079	901.600
270	48.978	30.030	917.887	16.259	934.146	901.629
271	50.119	29.346	917.932	16.288	934.220	901.644
272	51.286	28.678	917.976	16.328	934.304	901.648
273	52.481	28.026	918.011	16.346	934.357	901.666
274	53.703	27.388	918.062	16.355	934.417	901.707
275	54.954	26.764	918.108	16.368	934.477	901.740
276	56.234	26.155	918.144	16.382	934.527	901.762
277	57.544	25.560	918.181	16.399	934.580	901.782
278	58.884	24.978	918.223	16.413	934.636	901.811
279	60.256	24.409	918.272	16.435	934.707	901.837
280	61.660	23.854	918.322	16.464	934.787	901.858
281	63.096	23.311	918.385	16.473	934.858	901.912
282	64.565	22.780	918.441	16.474	934.916	901.967
283	66.069	22.262	918.496	16.480	934.976	902.017
284	67.608	21.755	918.553	16.490	935.043	902.064
285	69.183	21.260	918.614	16.502	935.117	902.112
286	70.795	20.776	918.655	16.525	935.180	902.130
287	72.444	20.303	918.711	16.550	935.262	902.161
288	74.131	19.841	918.762	16.567	935.329	902.196
289	75.858	19.389	918.833	16.582	935.415	902.251
290	77.625	18.948	918.899	16.592	935.491	902.307
291	79.433	18.516	918.955	16.601	935.556	902.354
292	81.283	18.095	919.015	16.617	935.632	902.398
293	83.176	17.683	919.090	16.630	935.720	902.461
294	85.114	17.280	919.174	16.642	935.816	902.532
295	87.096	16.887	919.251	16.654	935.906	902.597
296	89.125	16.503	919.322	16.674	935.996	902.648
297	91.201	16.127	919.407	16.688	936.095	902.719
298	93.325	15.760	919.486	16.704	936.190	902.783
299	95.499	15.401	919.552	16.726	936.278	902.826
300	97.724	15.051	919.628	16.762	936.390	902.867

$p_{Hg}$  - mercury intrusion pressure  
 $d_p$  - pore diameter  
 $V_p$  - specific pore volume

$U$  - uncertainty  
 $V_p+U$  - upper limit of the uncertainty interval  
 $V_p-U$  - lower limit of the uncertainty interval

**Certified values of pressure-volume and diameter-volume curves for ERM<sup>®</sup>-FD122 at each data point**

Data point No.	$p_{Hg}$ (MPa)	$d_p$ (nm)	$V_p$ (mm <sup>3</sup> g <sup>-1</sup> )	$U$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_{p+U}$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_{p-U}$ (mm <sup>3</sup> g <sup>-1</sup> )
301	100.000	14.708	919.711	16.801	936.513	902.910
302	102.329	14.373	919.781	16.843	936.624	902.938
303	104.713	14.046	919.855	16.873	936.728	902.982
304	107.152	13.726	919.919	16.902	936.821	903.018
305	109.648	13.414	919.994	16.942	936.936	903.052
306	112.202	13.109	920.074	16.986	937.061	903.088
307	114.815	12.810	920.150	16.998	937.148	903.152
308	117.490	12.519	920.231	17.031	937.262	903.201
309	120.226	12.234	920.326	17.059	937.385	903.267
310	123.027	11.955	920.414	17.084	937.498	903.331
311	125.893	11.683	920.503	17.113	937.616	903.390
312	128.825	11.417	920.583	17.150	937.733	903.433
313	131.826	11.157	920.661	17.172	937.833	903.490
314	134.896	10.903	920.728	17.212	937.941	903.516
315	138.038	10.655	920.817	17.255	938.072	903.563
316	141.254	10.412	920.917	17.264	938.181	903.654
317	144.544	10.175	921.017	17.287	938.304	903.731
318	147.911	9.944	921.121	17.294	938.415	903.827
319	151.356	9.718	921.207	17.312	938.520	903.895
320	154.882	9.496	921.302	17.344	938.647	903.958
321	158.489	9.280	921.395	17.360	938.756	904.035
322	162.181	9.069	921.506	17.360	938.866	904.146
323	165.959	8.862	921.639	17.373	939.013	904.266
324	169.824	8.661	921.749	17.377	939.126	904.373
325	173.780	8.464	921.848	17.390	939.239	904.458
326	177.828	8.271	921.975	17.399	939.374	904.576
327	181.970	8.083	922.082	17.416	939.498	904.667
328	186.209	7.899	922.183	17.435	939.619	904.748
329	190.546	7.719	922.340	17.477	939.817	904.863
330	194.984	7.543	922.492	17.487	939.980	905.005
331	199.526	7.371	922.614	17.499	940.113	905.115
332	204.174	7.204	922.665	17.493	940.158	905.172
333	208.930	7.040	922.701	17.477	940.178	905.224
334	213.796	6.879	922.738	17.454	940.193	905.284
335	218.776	6.723	922.779	17.438	940.217	905.341
336	223.872	6.570	922.822	17.426	940.248	905.397
337	229.087	6.420	922.854	17.411	940.265	905.444
338	234.423	6.274	922.894	17.396	940.290	905.499
339	239.883	6.131	922.935	17.384	940.319	905.551
340	245.471	5.992	922.969	17.378	940.347	905.591
341	251.189	5.855	922.994	17.375	940.369	905.619
342	257.040	5.722	923.027	17.371	940.398	905.656
343	263.027	5.592	923.052	17.364	940.417	905.688
344	269.153	5.465	923.080	17.360	940.440	905.720
345	275.423	5.340	923.108	17.355	940.463	905.753
346	281.838	5.219	923.160	17.344	940.504	905.816
347	288.403	5.100	923.215	17.334	940.550	905.881
348	295.121	4.984	923.263	17.323	940.587	905.940
349	301.995	4.870	923.321	17.310	940.631	906.011
350	309.030	4.759	923.389	17.292	940.682	906.097

$p_{Hg}$  - mercury intrusion pressure  
 $d_p$  - pore diameter  
 $V_p$  - specific pore volume

$U$  - uncertainty  
 $V_{p+U}$  - upper limit of the uncertainty interval  
 $V_{p-U}$  - lower limit of the uncertainty interval

**Certified values of pressure-volume and diameter-volume curves for ERM<sup>®</sup>-FD122 at each data point**

Data point No.	$p_{Hg}$ (MPa)	$d_p$ (nm)	$V_p$ (mm <sup>3</sup> g <sup>-1</sup> )	$U$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_{p+U}$ (mm <sup>3</sup> g <sup>-1</sup> )	$V_{p-U}$ (mm <sup>3</sup> g <sup>-1</sup> )
351	316.228	4.651	923.462	17.286	940.749	906.176
352	323.594	4.545	923.530	17.282	940.812	906.249
353	331.131	4.442	923.593	17.273	940.866	906.321
354	338.844	4.341	923.665	17.265	940.931	906.400
355	346.737	4.242	923.764	17.263	941.027	906.501
356	354.813	4.145	923.854	17.246	941.100	906.608
357	363.078	4.051	923.966	17.235	941.201	906.731
358	371.535	3.959	924.077	17.228	941.306	906.849
359	380.189	3.869	924.179	17.216	941.396	906.963
360	389.045	3.781	924.286	17.209	941.495	907.077
361	398.107	3.694	924.429	17.221	941.650	907.209

$p_{Hg}$  - mercury intrusion pressure  
 $d_p$  - pore diameter  
 $V_p$  - specific pore volume

$U$  - uncertainty  
 $V_{p+U}$  - upper limit of the uncertainty interval  
 $V_{p-U}$  - lower limit of the uncertainty interval