

ID N° 24605 - Contact Angle Measurement - M4^{d+}

Graphit/Wasser DL (A5)

5. Messung: 0 - 20mm, dynSpeed = 0,25mm/s, Beschl.g = 96%. *Start 13:20:06 #Sequenz: 'Erst- und Wiederholbenetzung'

0. Messung: 0 - 5mm, dynSpeed = 0,25mm/s, Beschl.g = 96%. *Start 12:35:13 #Sequenz: 'Erst- und Wiederholbenetzung'

Graphit-Elektrode (wie zule [Repetition N°5])

• **Graphit-E / Wasser** : (20,0°C, 2,9', 20mm, 0,250mm/s - dynamic)

$\Theta_{M,d} = 34 \pm 2,1^\circ$ CAH 47° , ${}^a\bar{E}_d = 55,59 \pm 0,79$ mN/m ${}^aH_d = -32,04$ mN/m, $\bar{B}_{\%,d} = 76,2\%$

Report

1. ===== Introduction =====

Principle: The M4 contact angle measurement using the *modified Wilhelmy method* is based on force measurements on a cuboid or cylindrical solid body brought into contact with a liquid surface. The contact line between the solid, the liquid surface, and the gas phase is called the three-phase boundary line (triple line), and the angle at which the liquid surface meets the three-phase boundary line is the contact angle θ (theta). The relative position of the three-phase boundary line-above, on, or below the surrounding liquid level-reflects the surface energy characteristics and is indicated by the resulting curvature of the meniscus. The weight of this meniscus curvature is determined gravimetrically, taking buoyancy and kinetic forces into account, and is related to the length of the three-phase boundary line. With perfect wetting ($\theta=0^\circ$), this specific force reaches a maximum value, which corresponds to the surface tension of the liquid; with poor wettability ($\theta>90^\circ$), however, this wetting force becomes negative. Energetic interactions between the solid and liquid phases are thus made visible through the contact angle. When the solid body is immersed, the *triple line scans the solid surface*, yielding the advancing contact angle (θ_A), and when it is withdrawn, the receding contact angle (θ_R) is obtained - measured by force of wetting. The difference ' $\theta_A - \theta_R$ ' is called the contact angle hysteresis (CAH).

Physically: The Wilhelmy equation $\cos\theta_{(A|R)} = {}^aF / (p \cdot \gamma)$ describes the relationship between the contact angle θ , the perimeter of the solid p , the wetting force aF , and the surface tension of the liquid γ . Adhesion tension aE is defined according ${}^aE_{A,R} = m_{meniscus} \cdot g / p = {}^aF / p = \gamma \cdot \cos\theta = \gamma_s - \gamma_{sl}$

Practically: In this measurement, after the position of contact of liquid and solid has been determined, the 'Graphit-E' test specimen is moved into and out of the Wasser liquid at a constant speed attended by 'CLT' (Constant-Level-Technic). This allows the determination of *most accurate dynamic contact angles*. While for each of the selected 388 measurements, the respective contact angle $\theta_{A,d}$ or $\theta_{R,d}$ is calculated independently.

Information: The IMETER M4 method description, available at <https://imeter.de/?view=article&id=46>, provides information on procedures and calculations.

2. ===== Collection of Measurements in this Series Graphit-E / Wasser =====

Tabelle 1.2: Conditions and Results

N°	IDN° ...erData41	ϑ [°C]	$\Delta\tau$ [min]	\bar{v}_z [mm/s]	\bar{C}_a [l]	t_{eq} [s]	Θ_M [°]	CAH [°]	aH [mN/m]	${}^a\bar{E}$ [mN/m]	$\pm\sigma$ [mN/m]	\bar{S} [m]/m ²	$\bar{B}_{\%,Wasser...}$ [%]
1.	24600 ₀	19,991	-23,8	0,250	3,22E-6	20,6	<45>	<91>	-78,4	38,1	±1,3	-34,9	52,2%
2.	24601 ₁	20	-13,5	0,250	3,22E-6	23,5	<34>	<67>	-48,37	52,6	±1,2	-20,4	72,0%
3.	24602 ₂	20	-10,8	0,250	3,22E-6	30,7	<31>	<62>	-41,2	55,2	±1,6	-17,8	75,6%
4.	24603 ₃	20	-7,52	0,250	3,22E-6	25,1	32	53	-34,71	55,27	±0,85	-17,7	75,7%
5.	24604 ₄	20	-3,92	0,250	3,22E-6	23,1	31	55	-35,57	55,9	±1,1	-17,1	76,5%
6.	24605₅	20	**0**	0,250	3,22E-06	21,8	21,8	34	47	-32,04	55,59	±0,79	-17,4 76,2%
7.	24606 ₆	20,02	+4,25	0,250	3,22E-6	25,6	39	37	-28,41	53,83	±0,98	-19,2	73,7%
8.	24607 ₇	20,021	+9,02	0,250	3,22E-6	25,0	46	23	-20,53	49,99	±0,88	-23,0	68,5%

This table provides an overview of the measurements in this series. Each separate M4 measurement is referenced by IDN°. The highlighted row indicates the data set of the measurement documented below. The column labeled ϑ shows the measurement temperature, $\Delta\tau$ the time interval to previous/following measurements, \bar{v}_z the movement speed - where additional symbols clarify: »n« indicates static measurements, <n> represents distance-accelerated movement of the triple line, ** stands for continuous acceleration and a number without any symbol indicates a constant movement speed, \bar{C}_a is the capillary number, t_{eq} is the equilibration time before turnaround - but for static measurements the number denotes the average equilibration time as a levelling time between the measurement points, Θ_M is the mean of the advancing and receding contact angle, contact angle hysteresis is given in degrees (CAH) and in energy units (aH), ${}^a\bar{E}$ is the mean adhesion energy, and $\pm\sigma$ is the corresponding standard deviation, \bar{S} is the mean of the spreading parameter, and $\bar{B}_{\%,Wasser...}$ indicates the relative wettability ($B_{\%,lq|sl|md...} = 100\% \cdot {}^aE/\gamma$).

Tabelle 2.2: Summary of sample weights in the individual measurements (initial weight $W_0 = 6,3380$ g)

N°	W_A [g]	ΔW_{A-0} [mg]	W_E [g]	ΔW_{E-0} [mg]	V_{E-0} [µL]	ΔV_{E-A} [µL]
1.	6,3380	0,0	6,3524	14,4	14,4	14
2.	6,3525	14,5	6,3527	14,7	14,7	0,30
3.	6,3528	14,8	6,3530	15,0	15,0	0,30
4.	6,3529	14,9	6,3534	15,4	15,4	0,40
5.	6,3533	15,3	6,3537	15,7	15,7	0,30
6.	6,3537	15,7	6,3540	16,0	16,0	0,30
7.	6,3540	16,0	6,3595	21,5	21,5	5,5
8.	6,3594	21,4	6,3543	16,3	16,3	-5,2

Symbols: W_A : Total weight before each measurement, ΔW_{A-0} : Change in weight from the initial weight W_0 at the start of the series, W_E : Total weight after the measurement (possibly including the weight of any adherent fluid), ΔW_{E-0} : Change in weight from the initial weight W_0 at the start of the series, V_{E-0} : Weight change interpreted as fluid volume, ΔV_{E-A} : Fluid volume change calculated as the difference between W_E and W_A . (Automated weighings without contact to the surface of the fluid).

3. ===== Measurement IDN°24605: Dynamic Contact Angle =====

Graphit-E, cylindric Ø8,00mm

20mm Graphit-E \ Wasser, $\gamma = 73$ mN/m $\vartheta = 20,0^\circ$ C

Contact Angle, CA $\Theta_{M,d}$	34 ± 2,1°	$\theta_{c,d} = 34^\circ$	
Contact Angle Hysteresis, CAH _d	47°		
	Advancing $\Theta_{A,d}$	Receding $\Theta_{R,d}$	Transition 1,097 mm
Contact Angles, Θ_d	57,2°	10°	75,5° _{adv.} ⇒ 43,6° _{rec.}
Standard deviation σ_θ	±0,6°	±2°	±0,1°
Rated measurements n mm-range	133 3,306 - 10,963mm	255 14,662 - -0,051mm	20 19,621 - 18,524mm
Linear regression, slope [°/mm]	-0,0523	1,37	29,2
Correlation coefficient r^2	0,03	0,87	0,99985

Triple line speed \bar{v}_z [mm/s] **0,250** $\pm 9,65E-04$ **-0,250** $\pm 9,28E-04$
Capillary number Ca **3,E-06** **-3,43E-06**

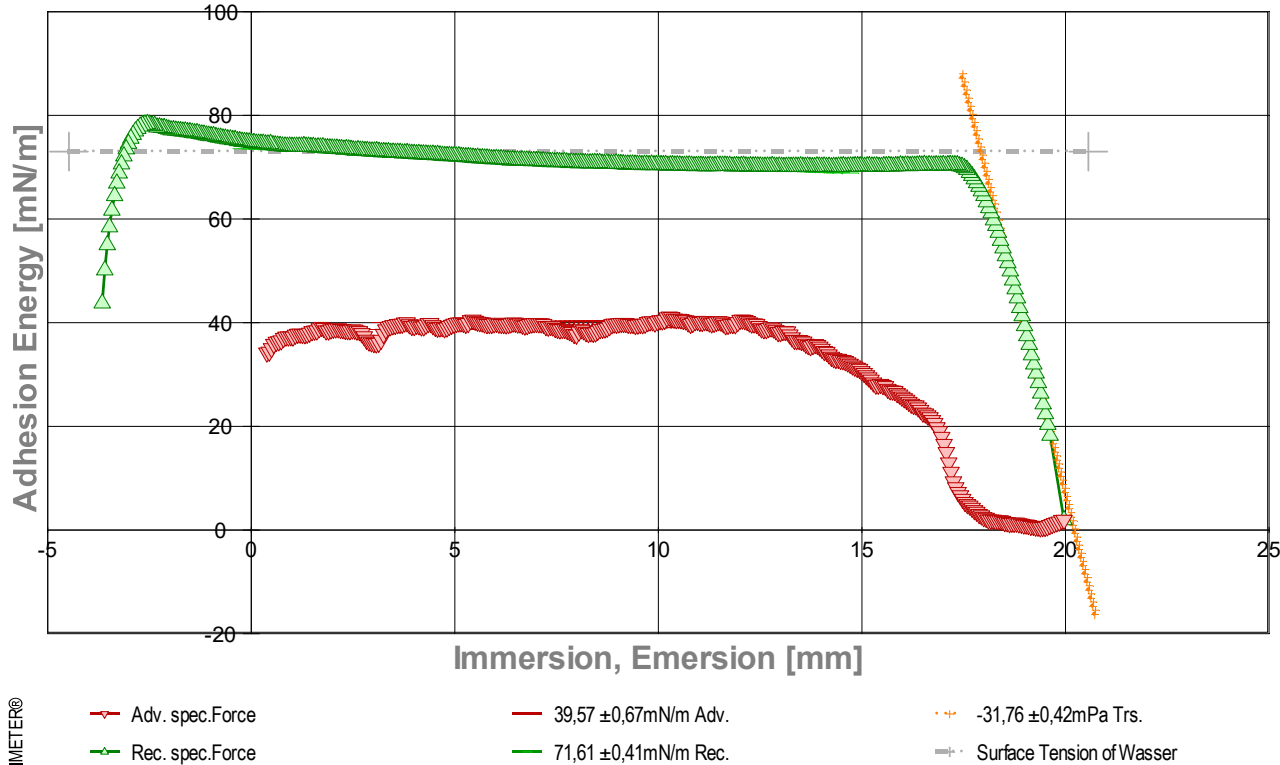
Dynamic Contact Angle Measurement: The Contact Angle θ_c is calculated from advancing and receding values according to the formula of Tadmore/Chibowski; the average value of advancing and receding Contact Angle is given by θ_m . (Derjaguin's Law: $e \sim 0,0047$ mm deposit layer). The change of the direction from advancing to receding - where the triple line may be pinned and only the angle is changing from advancing to receding - is analyzed within the column 'Transition'. (CA-Diagramm available)

Adhesion Force of the dynamic Triple Line

Energy of Adhesion, ${}^a\bar{E}_d = ({}^aE_{A,d} + {}^aE_{R,d}) / 2$ **55,59 \pm 0,79 mN/m**
Hysteresis, ${}^aH_d = {}^aE_{A,d} - {}^aE_{R,d}$ -32,04 mN/m
Parameter of spreading, $\bar{S}_d = {}^a\bar{E} - \gamma$ -17,41 mJ/m²
relative wettability, $\bar{B}_{\%,d} = 100 \cdot {}^a\bar{E} / \gamma$ 76,2% with Wasser

	Advancing ${}^aE_{A,d}$	Receding ${}^aE_{R,d}$	Transition 1,097 mm
Energy of Adhesion, aE_d [mN/m]	39,57	71,61	18,23 _{<adv.>} \Rightarrow 52,87 _{rec.}
Standard deviation ${}^a\sigma$ [mN/m]	$\pm 0,67$	$\pm 0,41$	$\pm 0,42$
Linear regression, slope [mPa]	0,06	-0,32	-31,76
correlation coefficient r^2	0,03	0,919	0,9985
Relative wettability, $B_{\%,d}$	54,2%	98,1%	

\rightarrow **Diagramm 1.3: 'Triple-line Force²' dynamic forces at the triple line, $\bar{v}_z = 0,25$ mm/s**



- Das Diagramm zeigt den Verlauf der Adhäsionsenergie aE entlang der Probenoberfläche. Die roten ∇ -Markierungen stehen für adv.-Messwerte (Eintauchen; von links nach rechts aufgezeichnet), grüne Δ -Markierungen gehören zu rec.-Werten (Rückzugsbewegung; von rechts nach links laufend). Die Oberflächenspannung von Wasser ist als grau gestrichelte Horizontale bei 73 mN/m eingezeichnet; sie gibt die *maximale Zugfestigkeit* an, die eine flüssige Wasser-Oberfläche aushalten kann. Die Adhäsionsenergie aE auf der Probenoberfläche ist kleiner als die Oberflächenspannung und verursacht Kontaktwinkel und je kleiner die Adhäsionsenergie ist, umso größer ist der Kontaktwinkel. Die orangefarben markierte Gerade misst die Steilheit der Adhäsionsenergie-Hysteresis, die mit der Umkehr der Bewegungsrichtung adv. \leftrightarrow rec. einher geht. Das dortige Pinning der Triple Line bedeutet, dass eine Bewegung von 0.1 mm eine Adhäsionsenergie-Änderung von 3,2 mN/m bzw. eine Kontaktwinkeländerung von 2,9° bewirkt.

4. ===== Details on the Measurement and Setup =====

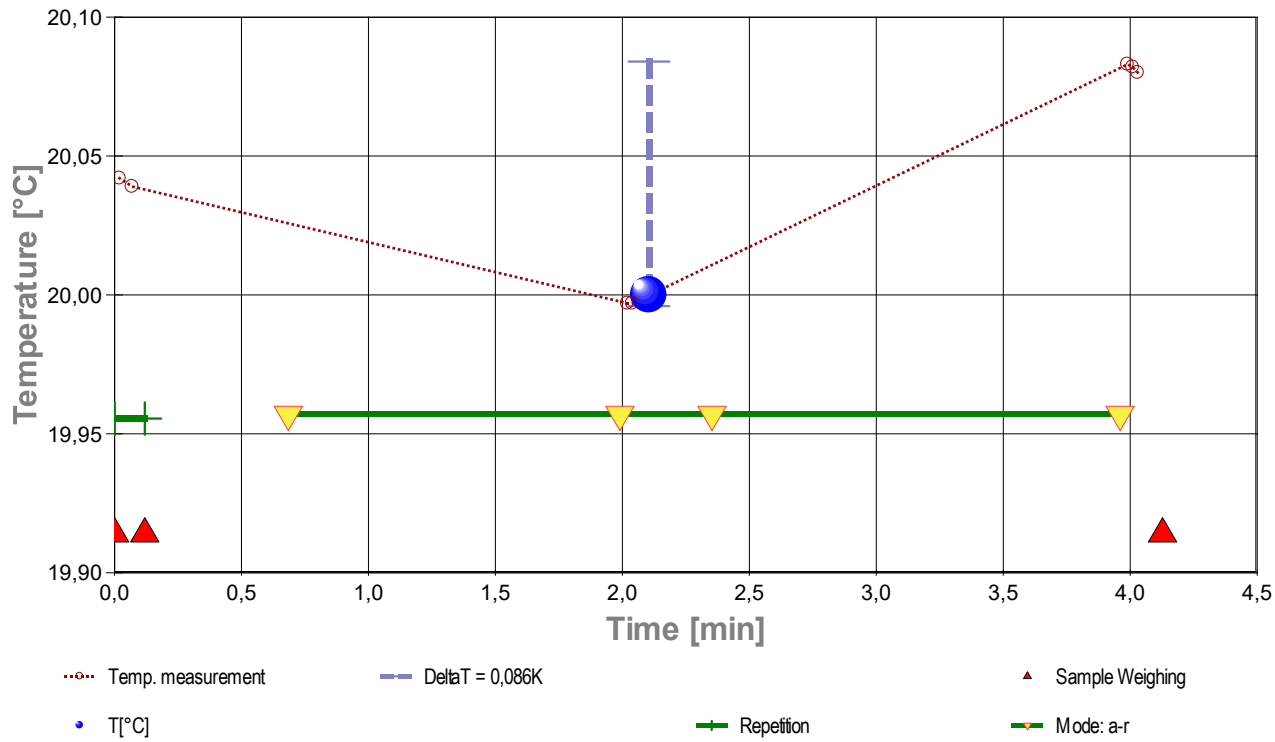
This document is reporting the **5. Repetition of the Measurement IDN°24600**

- Details of the setup, data on liquid and sample of this IDN°24605 are declared in the first measurement that is IDN°24600 of this series.

Weight at Start: 6,3537 g; alteration to reference 0,0157 g.

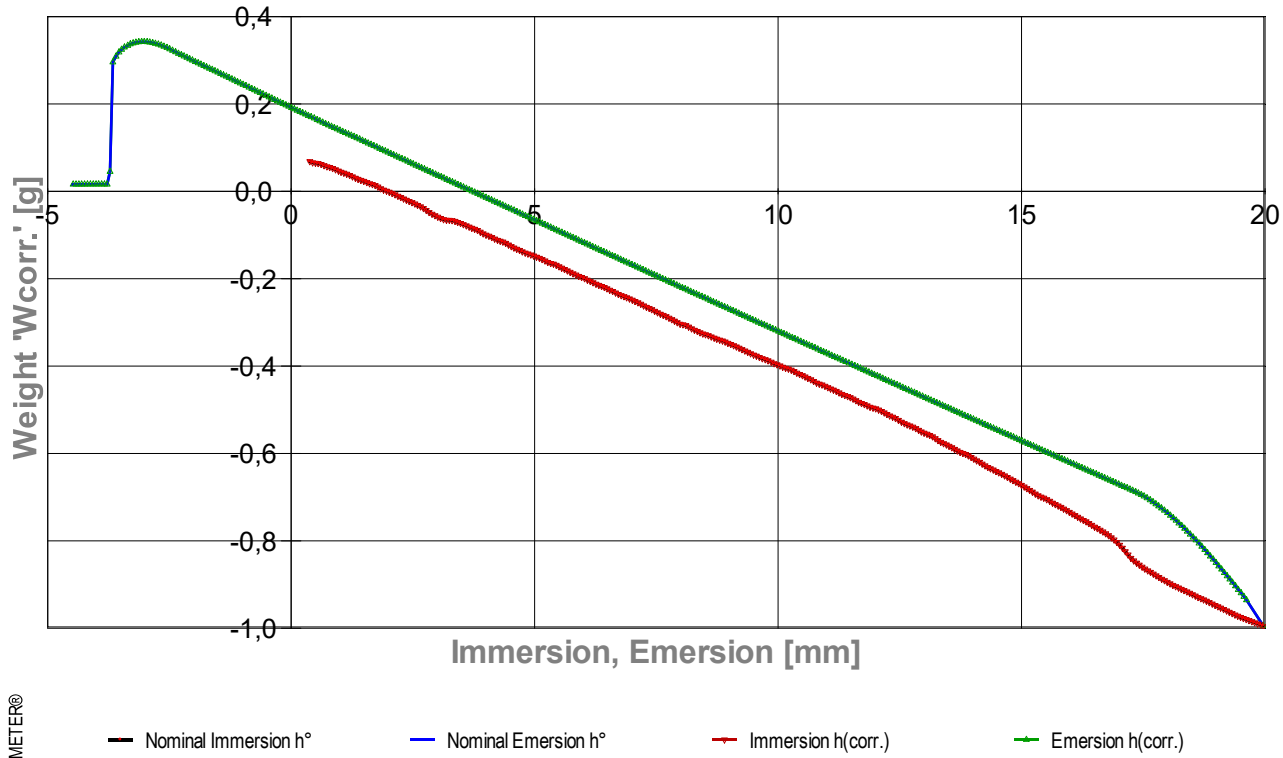
Measurement algorithm: dynamic CA-measurement, acquisition during constant movement. Maximum immersion of 19,964 mm and force equilibration at the inflection point for 21,8 s. Duration for immersion 1,3 min, for emersion 1,6 min. The *CLT* was used. - *The 'CLT' Constant-Level-Technic prevents rising/falling of the Wasser-level in the vessel (surface 1452mm²) through immersion/emersion of the sample volume in the vessel by appropriate pumping of Wasser.*

Time & Temperature: Messdauer vier Minuten; Temperaturänderung im Bereich von 20,00 bis 20,08°C. \rightarrow **Diagramm 2.4: 'Temperature & Events²' -- Survey on Temperature and Time**



- Das Diagramm "Temperature & Events²" dokumentiert neben der Flüssigkeitstemperatur der Messfluids (Wasser) die zeitliche Abfolge der Verfahrensschritte. Die Temperaturmesswerte sind als kleine Kreise abgebildet; die kugelförmige Marke gibt die der Messung insgesamt zugeordnete Temperatur an (20°C). Weitere gelbe Dreiecke auf der grünen Horizontalen bezeichnen die Schaltung jeweiliger Messmodi ('a-r' bedeutet *Advancing-* - und *Receding-*Bewegung). Die roten Dreiecke, unten im Diagramm, markieren die Zeitpunkte der Probenwägung von Graphit-E (ohne Kontakt zur Fluidoberfläche).

- Diagramm 3.4: 'RawData²' -- Acquired weights during immersion and emersion (raw data and immersion corrected lengths)



- Im Diagramm "RawData²" werden die Wägewerte zur dynamischen Kontaktwinkelmessung gegen die Eintauchtiefe der Probe abgebildet. Von den Roh-Wägewerten W_{RAW} wurden Proben- und Aufhängungsgewichte subtrahiert, so dass hier die *Gewichte* der Benetzungs- und Auftriebskräfte abgebildet werden ($W_{corr.}$). Die Kurvenverläufe fallen mit der Eintauchtiefe h (*immersion depth*) ab, indes der Volumenauftrieb des eintauchenden Probekörpers zunimmt. Im Diagramm sind Wägewerte für die *advancing-* und *receding-*Bewegung eingetragen, sowohl für nominelle (h_0) und für korrigierte Eintauchtiefen ($h_{corr.}$). Die roten Dreiecke bezeichnen die Messwerte bei $h_{corr.}$ bei der Vorwärtsbewegung (adv.), die grünen Dreiecke gehören zu Auszugsbewegungen (rec.). Durch 'CLT' (die *Constant-Level-Technic*) wird die Pegelveränderung besonders durch das ein- und austauchendes Probenvolumen simultan kompensiert, sodass die nominelle Eintauchtief mit der tatsächlichen identisch ist; die Kurven sind deshalb praktisch deckungsgleich. Weiterhin zeigt das Diagramm noch Werte zu *negativen Eintauchtiefen*. Diese Wertepaare gehören der *Kapillarbrücke* ($cb = capillary\ bridge$) an, die sich beim Herausziehen der Probe über das Flüssigkeitsniveau deutlich ausbilden kann; besonders, wenn das Probenende scharfkantig ist.

5. ===== Table of raw data and results =====

The table below provides the data for each contact angle measuring position in this experiment ($n=742$). - Within a row the column t lists the time of the CA-measurement. W_{RAW} is the original weighing data. The nominal distance between the sample bottom flatface and the liquid surface is given by h_0 , whilst $h_{corr.}$ shows the corrected immersion depth- *due to CLT the values are the same*. The sum of calculated dynamic forces are taken into account by $F_{dyn.}$. The $W_{corr.}$ -values* are the original raw weighing values when the weight

of the sample and its holder ($W_0=6,338g$) is subtracted. After buoyancy- correction, aF is the force exerted on the triple line. The Energy of Adhesion ${}^aE_{A,R} = {}^aF/p$ is the force of adhesion per meter of the circumference (p) of the sample. θ is the Contact Angle. The last column indicates by **chr** the **advancing** resp. **receding** state; **cb** tags values of a 'capillary bridge' above the surface-level.

$$({}^aF = (W_{RAW} - W_0 - W_{Buoy.}) \cdot g + F_{Buoy.air} - F_{visc} - F_{kinet} - F_{work} = (W_{corr.} - W_{Buoy.}) \cdot g - F_{dyn.})$$

Table 3.5: Data table

N°	t [sec]	W _{RAW} [g]	h ₀ [mm]	h _{corr.} [mm]	F _{dyn.} [mN]	W _{corr.} [g]	aF [mN]	${}^aE_{A,R}$ [mN/m]	θ [°deg]	chr
1.	0,00	6,4065	0,382	0,382	0	0,0685	0,8596	34,20	62,06	a
2.	0,24	6,4040	0,441	0,441	7,42E-06	0,0660	0,8637	34,37	61,92	a
3.	0,46	6,4029	0,497	0,497	7,54E-06	0,0649	0,8807	35,04	61,31	a
4.	0,69	6,4022	0,554	0,554	7,66E-06	0,0642	0,9016	35,87	60,57	a
5.	0,94	6,4002	0,615	0,615	7,79E-06	0,0622	0,9119	36,28	60,20	a
6.	1,17	6,3974	0,675	0,675	7,92E-06	0,0594	0,9142	36,37	60,11	a
7.	1,41	6,3949	0,734	0,734	8,04E-06	0,0569	0,9185	36,55	59,96	a
8.	1,65	6,3932	0,792	0,792	8,16E-06	0,0552	0,9303	37,01	59,53	a
9.	1,88	6,3909	0,851	0,851	8,29E-06	0,0529	0,9368	37,27	59,30	a
10.	2,13	6,3880	0,911	0,911	8,41E-06	0,0500	0,9375	37,30	59,27	a
11.	2,36	6,3851	0,970	0,970	8,54E-06	0,0471	0,9383	37,33	59,24	a
12.	2,57	6,3823	1,024	1,024	8,65E-06	0,0443	0,9372	37,29	59,28	a
13.	2,80	6,3803	1,083	1,083	8,77E-06	0,0423	0,9464	37,66	58,95	a
14.	3,04	6,3778	1,141	1,141	8,90E-06	0,0398	0,9507	37,83	58,79	a
15.	3,28	6,3749	1,200	1,200	9,02E-06	0,0369	0,9512	37,85	58,77	a
16.	3,51	6,3718	1,258	1,258	9,14E-06	0,0338	0,9491	37,76	58,85	a
17.	3,75	6,3687	1,318	1,318	9,27E-06	0,0307	0,9483	37,73	58,88	a
18.	3,97	6,3662	1,374	1,374	9,38E-06	0,0282	0,9509	37,84	58,78	a
19.	4,20	6,3638	1,432	1,432	9,51E-06	0,0258	0,9559	38,03	58,60	a
20.	4,46	6,3615	1,493	1,493	9,63E-06	0,0235	0,9633	38,33	58,33	a
21.	4,69	6,3587	1,553	1,553	9,76E-06	0,0207	0,9656	38,42	58,24	a
22.	4,92	6,3560	1,610	1,610	9,88E-06	0,0180	0,9671	38,48	58,19	a
23.	5,15	6,3541	1,669	1,669	1,00E-05	0,0161	0,9772	38,88	57,82	a
24.	5,38	6,3519	1,726	1,726	1,01E-05	0,0139	0,9836	39,14	57,58	a
25.	5,60	6,3486	1,782	1,782	1,02E-05	0,0106	0,9789	38,95	57,76	a
26.	5,83	6,3446	1,838	1,838	1,04E-05	0,0066	0,9670	38,48	58,19	a
27.	6,07	6,3415	1,898	1,898	1,05E-05	0,0035	0,9661	38,44	58,23	a
28.	6,30	6,3391	1,958	1,958	1,06E-05	0,0011	0,9718	38,67	58,01	a
29.	6,54	6,3366	2,014	2,014	1,07E-05	-0,0014	0,9752	38,80	57,89	a
30.	6,77	6,3337	2,075	2,075	1,09E-05	-0,0043	0,9764	38,85	57,85	a
31.	7,01	6,3308	2,134	2,134	1,10E-05	-0,0072	0,9770	38,88	57,82	a
32.	7,24	6,3275	2,193	2,193	1,11E-05	-0,0105	0,9735	38,73	57,96	a
33.	7,48	6,3245	2,251	2,251	1,12E-05	-0,0135	0,9729	38,71	57,98	a
34.	7,71	6,3213	2,309	2,309	1,14E-05	-0,0167	0,9696	38,58	58,10	a
35.	7,94	6,3183	2,366	2,366	1,15E-05	-0,0197	0,9682	38,52	58,15	a
36.	8,17	6,3154	2,423	2,423	1,16E-05	-0,0226	0,9681	38,52	58,15	a
37.	8,40	6,3128	2,482	2,482	1,17E-05	-0,0252	0,9715	38,66	58,03	a
38.	8,64	6,3098	2,540	2,540	1,18E-05	-0,0282	0,9706	38,62	58,06	a
39.	8,86	6,3065	2,596	2,596	1,20E-05	-0,0315	0,9656	38,42	58,24	a
40.	9,10	6,3032	2,657	2,657	1,21E-05	-0,0348	0,9633	38,33	58,33	a
41.	9,34	6,2993	2,716	2,716	1,22E-05	-0,0387	0,9538	37,95	58,67	a
42.	9,57	6,2948	2,775	2,775	1,23E-05	-0,0432	0,9385	37,34	59,23	a
43.	9,82	6,2902	2,832	2,832	1,25E-05	-0,0478	0,9217	36,67	59,84	a
44.	10,05	6,2863	2,893	2,893	1,26E-05	-0,0517	0,9131	36,33	60,15	a
45.	10,28	6,2829	2,952	2,952	1,27E-05	-0,0551	0,9090	36,17	60,30	a
46.	10,53	6,2796	3,011	3,011	1,28E-05	-0,0584	0,9056	36,03	60,42	a
47.	10,76	6,2765	3,069	3,069	1,29E-05	-0,0615	0,9036	35,95	60,49	a
48.	11,00	6,2738	3,130	3,130	1,31E-05	-0,0642	0,9070	36,09	60,37	a
49.	11,23	6,2723	3,189	3,189	1,32E-05	-0,0657	0,9212	36,65	59,86	a
50.	11,47	6,2723	3,248	3,248	1,33E-05	-0,0657	0,9501	37,80	58,81	a
51.	11,70	6,2716	3,306	3,306	1,34E-05	-0,0664	0,9717	38,66	58,02	a
52.	11,94	6,2699	3,365	3,365	1,36E-05	-0,0681	0,9841	39,16	57,56	a
53.	12,16	6,2675	3,420	3,420	1,37E-05	-0,0705	0,9876	39,29	57,43	a
54.	12,39	6,2650	3,478	3,478	1,38E-05	-0,0730	0,9918	39,46	57,28	a
55.	12,63	6,2623	3,536	3,536	1,39E-05	-0,0757	0,9936	39,53	57,21	a
56.	12,86	6,2597	3,595	3,595	1,41E-05	-0,0783	0,9973	39,68	57,07	a
57.	13,09	6,2569	3,654	3,654	1,42E-05	-0,0811	0,9986	39,73	57,02	a
58.	13,32	6,2542	3,710	3,710	1,43E-05	-0,0838	0,9995	39,77	56,99	a
59.	13,56	6,2519	3,768	3,768	1,44E-05	-0,0861	1,0054	40,00	56,77	a
60.	13,79	6,2490	3,827	3,827	1,45E-05	-0,0890	1,0061	40,03	56,75	a
61.	14,01	6,2452	3,884	3,884	1,47E-05	-0,0928	0,9967	39,66	57,09	a
62.	14,25	6,2414	3,943	3,943	1,48E-05	-0,0966	0,9883	39,33	57,40	a
63.	14,49	6,2384	4,002	4,002	1,49E-05	-0,0996	0,9878	39,30	57,43	a
64.	14,72	6,2361	4,061	4,061	1,50E-05	-0,1019	0,9944	39,57	57,18	a
65.	14,96	6,2329	4,120	4,120	1,52E-05	-0,1051	0,9919	39,47	57,27	a
66.	15,19	6,2294	4,178	4,178	1,53E-05	-0,1086	0,9863	39,24	57,48	a
67.	15,43	6,2265	4,237	4,237	1,54E-05	-0,1115	0,9868	39,26	57,46	a
68.	15,65	6,2246	4,292	4,292	1,55E-05	-0,1134	0,9952	39,60	57,15	a
69.	15,87	6,2226	4,347	4,347	1,56E-05	-0,1154	1,0026	39,89	56,87	a
70.	16,10	6,2197	4,406	4,406	1,58E-05	-0,1183	1,0029	39,91	56,86	a
71.	16,33	6,2158	4,463	4,463	1,59E-05	-0,1222	0,9924	39,49	57,25	a
72.	16,56	6,2121	4,520	4,520	1,60E-05	-0,1259	0,9843	39,16	57,56	a
73.	16,79	6,2089	4,575	4,575	1,61E-05	-0,1291	0,9801	39,00	57,71	a
74.	17,01	6,2062	4,632	4,632	1,62E-05	-0,1318	0,9815	39,05	57,66	a
75.	17,24	6,2035	4,689	4,689	1,64E-05	-0,1345	0,9830	39,11	57,60	a
76.	17,46	6,2001	4,746	4,746	1,65E-05	-0,1379	0,9774	38,89	57,81	a
77.	17,70	6,1974	4,807	4,807	1,66E-05	-0,1406	0,9810	39,03	57,68	a
78.	17,93	6,1953	4,863	4,863	1,67E-05	-0,1427	0,9880	39,31	57,42	a
79.	18,16	6,1930	4,921	4,921	1,68E-05	-0,1450	0,9940	39,55	57,19	a
80.	18,40	6,1906	4,980	4,980	1,70E-05	-0,1474	0,9992	39,76	57,00	a
81.	18,63	6,1880	5,039	5,039	1,71E-05	-0,1500	1,0028	39,90	56,87	a
82.	18,87	6,1853	5,098	5,098	1,72E-05	-0,1527	1,0053	40,00	56,77	a
83.	19,10	6,1826	5,153	5,153	1,73E-05	-0,1554	1,0060	40,03	56,75	a
84.	19,33	6,1794	5,212	5,212	1,75E-05	-0,1586	1,0033	39,92	56,85	a
85.	19,56	6,1760	5,270	5,270	1,76E-05	-0,1620	0,9986	39,73	57,02	a
86.	19,80	6,1734	5,329	5,329	1,77E-05	-0,1646	1,0022	39,88	56,89	a
87.	20,02	6,1720	5,386	5,386	1,78E-05	-0,1660	1,0163	40,44	56,36	a
88.	20,25	6,1694	5,444	5,444	1,79E-05	-0,1686	1,0191	40,55	56,26	a
89.	20,48	6,1660	5,501	5,501	1,81E-05	-0,1720	1,0137	40,33	56,46	a
90.	20,70	6,1628	5,555	5,555	1,82E-05	-0,1752	1,0091	40,15	56,63	a
91.	20,93	6,1597	5,613	5,613	1,83E-05	-0,1783	1,0068	40,06	56,72	a

92.	21,17	6,1566	5,672	5,672	1,84E-05	-0,1814	1,0055	40,01	56,77	a
93.	21,41	6,1533	5,729	5,729	1,85E-05	-0,1847	1,0012	39,84	56,93	a
94.	21,65	6,1499	5,789	5,789	1,87E-05	-0,1881	0,9976	39,69	57,06	a
95.	21,87	6,1470	5,848	5,848	1,88E-05	-0,1910	0,9977	39,70	57,06	a
96.	22,11	6,1441	5,906	5,906	1,89E-05	-0,1939	0,9981	39,71	57,04	a
97.	22,34	6,1415	5,965	5,965	1,90E-05	-0,1965	1,0016	39,85	56,91	a
98.	22,59	6,1388	6,024	6,024	1,92E-05	-0,1992	1,0039	39,94	56,83	a
99.	22,81	6,1354	6,083	6,083	1,93E-05	-0,2026	0,9995	39,77	56,99	a
100.	23,06	6,1323	6,142	6,142	1,94E-05	-0,2057	0,9980	39,71	57,05	a
101.	23,28	6,1294	6,200	6,200	1,95E-05	-0,2086	0,9980	39,71	57,05	a
102.	23,52	6,1262	6,260	6,260	1,97E-05	-0,2118	0,9960	39,63	57,12	a
103.	23,76	6,1234	6,319	6,319	1,98E-05	-0,2146	0,9976	39,69	57,06	a
104.	23,98	6,1209	6,376	6,376	1,99E-05	-0,2171	1,0011	39,83	56,93	a
105.	24,21	6,1185	6,432	6,432	2,00E-05	-0,2195	1,0049	39,98	56,79	a
106.	24,43	6,1157	6,486	6,486	2,01E-05	-0,2223	1,0041	39,95	56,82	a
107.	24,66	6,1124	6,544	6,544	2,03E-05	-0,2256	1,0001	39,79	56,97	a
108.	24,90	6,1095	6,602	6,602	2,04E-05	-0,2285	1,0003	39,80	56,96	a
109.	25,12	6,1060	6,661	6,661	2,05E-05	-0,2320	0,9947	39,58	57,17	a
110.	25,36	6,1026	6,720	6,720	2,06E-05	-0,2354	0,9903	39,40	57,33	a
111.	25,59	6,0999	6,778	6,778	2,07E-05	-0,2381	0,9925	39,49	57,25	a
112.	25,82	6,0976	6,835	6,835	2,09E-05	-0,2404	0,9978	39,70	57,05	a
113.	26,04	6,0951	6,890	6,890	2,10E-05	-0,2429	1,0003	39,80	56,96	a
114.	26,27	6,0924	6,947	6,947	2,11E-05	-0,2456	1,0020	39,87	56,90	a
115.	26,50	6,0896	7,005	7,005	2,12E-05	-0,2484	1,0032	39,91	56,85	a
116.	26,73	6,0866	7,062	7,062	2,13E-05	-0,2514	1,0016	39,85	56,91	a
117.	26,98	6,0836	7,121	7,121	2,15E-05	-0,2544	1,0011	39,83	56,93	a
118.	27,21	6,0803	7,181	7,181	2,16E-05	-0,2577	0,9983	39,72	57,03	a
119.	27,44	6,0764	7,238	7,238	2,17E-05	-0,2616	0,9878	39,30	57,43	a
120.	27,67	6,0732	7,296	7,296	2,18E-05	-0,2648	0,9849	39,19	57,53	a
121.	27,89	6,0707	7,353	7,353	2,20E-05	-0,2673	0,9885	39,33	57,40	a
122.	28,11	6,0678	7,406	7,406	2,21E-05	-0,2702	0,9861	39,24	57,49	a
123.	28,34	6,0641	7,465	7,465	2,22E-05	-0,2739	0,9787	38,94	57,76	a
124.	28,59	6,0607	7,524	7,524	2,23E-05	-0,2773	0,9743	38,77	57,92	a
125.	28,82	6,0575	7,583	7,583	2,24E-05	-0,2805	0,9717	38,66	58,02	a
126.	29,06	6,0547	7,642	7,642	2,26E-05	-0,2833	0,9735	38,74	57,95	a
127.	29,30	6,0518	7,702	7,702	2,27E-05	-0,2862	0,9742	38,76	57,93	a
128.	29,53	6,0483	7,761	7,761	2,28E-05	-0,2897	0,9691	38,56	58,12	a
129.	29,75	6,0449	7,817	7,817	2,29E-05	-0,2931	0,9634	38,33	58,32	a
130.	29,97	6,0417	7,872	7,872	2,30E-05	-0,2963	0,9589	38,16	58,49	a
131.	30,20	6,0379	7,929	7,929	2,32E-05	-0,3001	0,9498	37,79	58,82	a
132.	30,44	6,0346	7,988	7,988	2,33E-05	-0,3034	0,9462	37,65	58,95	a
133.	30,67	6,0332	8,047	8,047	2,34E-05	-0,3048	0,9614	38,25	58,40	a
134.	30,91	6,0314	8,106	8,106	2,35E-05	-0,3066	0,9726	38,70	57,99	a
135.	31,15	6,0280	8,163	8,163	2,37E-05	-0,3100	0,9674	38,49	58,18	a
136.	31,38	6,0241	8,223	8,223	2,38E-05	-0,3139	0,9586	38,14	58,50	a
137.	31,61	6,0207	8,282	8,282	2,39E-05	-0,3173	0,9543	37,97	58,66	a
138.	31,85	6,0181	8,341	8,341	2,40E-05	-0,3199	0,9578	38,11	58,53	a
139.	32,08	6,0150	8,398	8,398	2,42E-05	-0,3230	0,9554	38,01	58,62	a
140.	32,31	6,0123	8,456	8,456	2,43E-05	-0,3257	0,9570	38,08	58,56	a
141.	32,53	6,0104	8,510	8,510	2,44E-05	-0,3276	0,9653	38,41	58,26	a
142.	32,76	6,0083	8,569	8,569	2,45E-05	-0,3297	0,9733	38,73	57,96	a
143.	33,00	6,0055	8,628	8,628	2,46E-05	-0,3325	0,9748	38,79	57,90	a
144.	33,24	6,0027	8,687	8,687	2,48E-05	-0,3353	0,9764	38,85	57,85	a
145.	33,46	6,0003	8,742	8,742	2,49E-05	-0,3377	0,9800	38,99	57,71	a
146.	33,69	5,9981	8,801	8,801	2,50E-05	-0,3399	0,9875	39,29	57,43	a
147.	33,92	5,9962	8,859	8,859	2,51E-05	-0,3418	0,9970	39,67	57,08	a
148.	34,14	5,9938	8,913	8,913	2,52E-05	-0,3442	1,0003	39,80	56,96	a
149.	34,37	5,9908	8,971	8,971	2,54E-05	-0,3472	0,9990	39,75	57,01	a
150.	34,60	5,9881	9,029	9,029	2,55E-05	-0,3499	1,0012	39,83	56,93	a
151.	34,84	5,9853	9,088	9,088	2,56E-05	-0,3527	1,0028	39,90	56,87	a
152.	35,07	5,9825	9,144	9,144	2,57E-05	-0,3555	1,0028	39,90	56,87	a
153.	35,29	5,9797	9,200	9,200	2,58E-05	-0,3583	1,0025	39,89	56,88	a
154.	35,52	5,9764	9,258	9,258	2,60E-05	-0,3616	0,9989	39,75	57,01	a
155.	35,76	5,9733	9,318	9,318	2,61E-05	-0,3647	0,9978	39,70	57,05	a
156.	36,00	5,9704	9,377	9,377	2,62E-05	-0,3676	0,9984	39,73	57,03	a
157.	36,24	5,9669	9,436	9,436	2,63E-05	-0,3711	0,9930	39,51	57,23	a
158.	36,48	5,9640	9,498	9,498	2,65E-05	-0,3740	0,9951	39,59	57,16	a
159.	36,71	5,9615	9,555	9,555	2,66E-05	-0,3765	0,9988	39,74	57,02	a
160.	36,95	5,9583	9,616	9,616	2,67E-05	-0,3797	0,9970	39,67	57,08	a
161.	37,21	5,9555	9,677	9,677	2,68E-05	-0,3825	0,9995	39,77	56,99	a
162.	37,44	5,9532	9,738	9,738	2,70E-05	-0,3848	1,0069	40,06	56,71	a
163.	37,67	5,9507	9,795	9,795	2,71E-05	-0,3873	1,0104	40,20	56,58	a
164.	37,93	5,9476	9,858	9,858	2,72E-05	-0,3904	1,0108	40,22	56,57	a
165.	38,17	5,9440	9,918	9,918	2,73E-05	-0,3940	1,0051	39,99	56,78	a
166.	38,41	5,9415	9,981	9,981	2,75E-05	-0,3965	1,0114	40,24	56,55	a
167.	38,65	5,9390	10,040	10,040	2,76E-05	-0,3990	1,0162	40,43	56,37	a
168.	38,87	5,9361	10,096	10,096	2,77E-05	-0,4019	1,0152	40,39	56,40	a
169.	39,10	5,9335	10,154	10,154	2,78E-05	-0,4045	1,0180	40,51	56,30	a
170.	39,34	5,9318	10,213	10,213	2,80E-05	-0,4062	1,0301	40,99	55,84	a
171.	39,57	5,9293	10,271	10,271	2,81E-05	-0,4087	1,0342	41,15	55,69	a
172.	39,80	5,9262	10,328	10,328	2,82E-05	-0,4118	1,0318	41,05	55,78	a
173.	40,04	5,9225	10,386	10,386	2,83E-05	-0,4155	1,0240	40,74	56,07	a
174.	40,26	5,9194	10,443	10,443	2,85E-05	-0,4186	1,0215	40,64	56,17	a
175.	40,48	5,9167	10,500	10,500	2,86E-05	-0,4213	1,0230	40,71	56,11	a
176.	40,71	5,9137	10,556	10,556	2,87E-05	-0,4243	1,0211	40,63	56,18	a
177.	40,94	5,9105	10,613	10,613	2,88E-05	-0,4275	1,0178	40,50	56,31	a
178.	41,18	5,9073	10,673	10,673	2,89E-05	-0,4307	1,0156	40,41	56,39	a
179.	41,42	5,9034	10,731	10,731	2,91E-05	-0,4346	1,0060	40,03	56,75	a
180.	41,65	5,8997	10,790	10,790	2,92E-05	-0,4383	0,9987	39,74	57,02	a
181.	41,87	5,8974	10,845	10,845	2,93E-05	-0,4406	1,0032	39,92	56,85	a
182.	42,11	5,8954	10,903	10,903	2,94E-05	-0,4426	1,0119	40,26	56,53	a
183.	42,35	5,8925	10,963	10,963	2,95E-05	-0,4455	1,0132	40,31	56,48	a
184.	42,57	5,8891	11,021	11,021	2,97E-05	-0,4489	1,0083	40,12	56,66	a
185.	42,80	5,8862	11,078	11,078	2,98E-05	-0,4518	1,0078	40,10	56,68	a
186.	43,03	5,8837	11,137	11,137	2,99E-05	-0,4543	1,0120	40,27	56,52	a
187.	43,28	5,8807	11,195	11,195	3,00E-05	-0,4573	1,0112	40,23	56,55	a
188.	43,50	5,8772	11,253	11,253	3,02E-05	-0,4608	1,0054	40,00	56,77	a
189.	43,74	5,8739	11,310	11,310	3,03E-05	-0,4641	1,0012	39,83	56,93	a
190.	43,97	5,8712	11,370	11,370	3,04E-05	-0,4668	1,0039	39,94	56,83	a
191.	44,20	5,8688	11,428	11,428	3,05E-05	-0,4692	1,0090	40,15	56,64	a
192.	44,43	5,8663	11,484	11,484	3,06E-05	-0,4717	1,0118	40,26	56,53	a
193.	44,65	5,8632	11,540	11,540	3,08E-05	-0,4748	1,0092	40,15	56,63	a
194.	44,88	5,8595	11,599	11,599	3,09E-05	-0,4785	1,0015	39,85	56,92	a

195.	45,11	5,8557	11,656	11,656	3,10E-05	-0,4823	0,9922	39,48	57,26	a
196.	45,35	5,8530	11,713	11,713	3,11E-05	-0,4850	0,9940	39,55	57,19	a
197.	45,59	5,8506	11,772	11,772	3,12E-05	-0,4874	0,9994	39,76	57,00	a
198.	45,81	5,8475	11,831	11,831	3,14E-05	-0,4905	0,9977	39,70	57,06	a
199.	46,05	5,8444	11,890	11,890	3,15E-05	-0,4936	0,9964	39,65	57,10	a
200.	46,29	5,8425	11,950	11,950	3,16E-05	-0,4955	1,0072	40,08	56,70	a
201.	46,52	5,8408	12,006	12,006	3,17E-05	-0,4972	1,0181	40,51	56,30	a
202.	46,75	5,8380	12,064	12,064	3,19E-05	-0,5000	1,0193	40,56	56,25	a
203.	46,98	5,8348	12,124	12,124	3,20E-05	-0,5032	1,0170	40,47	56,34	a
204.	47,21	5,8315	12,181	12,181	3,21E-05	-0,5065	1,0127	40,30	56,50	a
205.	47,43	5,8280	12,236	12,236	3,22E-05	-0,5100	1,0054	40,00	56,77	a
206.	47,66	5,8246	12,293	12,293	3,23E-05	-0,5134	1,0001	39,79	56,97	a
207.	47,90	5,8217	12,352	12,352	3,25E-05	-0,5163	1,0008	39,82	56,94	a
208.	48,14	5,8185	12,412	12,412	3,26E-05	-0,5195	0,9987	39,74	57,02	a
209.	48,39	5,8144	12,473	12,473	3,27E-05	-0,5236	0,9882	39,32	57,41	a
210.	48,63	5,8102	12,534	12,534	3,28E-05	-0,5278	0,9771	38,88	57,82	a
211.	48,87	5,8068	12,592	12,592	3,30E-05	-0,5312	0,9726	38,70	57,99	a
212.	49,10	5,8039	12,651	12,651	3,31E-05	-0,5341	0,9731	38,72	57,97	a
213.	49,32	5,8016	12,708	12,708	3,32E-05	-0,5364	0,9784	38,93	57,77	a
214.	49,57	5,7989	12,769	12,769	3,33E-05	-0,5391	0,9818	39,06	57,65	a
215.	49,80	5,7954	12,828	12,828	3,35E-05	-0,5426	0,9766	38,86	57,84	a
216.	50,05	5,7916	12,887	12,887	3,36E-05	-0,5464	0,9680	38,52	58,16	a
217.	50,27	5,7879	12,942	12,942	3,37E-05	-0,5501	0,9589	38,15	58,49	a
218.	50,50	5,7850	12,999	12,999	3,38E-05	-0,5530	0,9584	38,13	58,51	a
219.	50,72	5,7826	13,058	13,058	3,39E-05	-0,5554	0,9640	38,36	58,30	a
220.	50,95	5,7798	13,115	13,115	3,41E-05	-0,5582	0,9644	38,37	58,29	a
221.	51,18	5,7767	13,172	13,172	3,42E-05	-0,5613	0,9620	38,28	58,38	a
222.	51,40	5,7724	13,228	13,228	3,43E-05	-0,5656	0,9472	37,69	58,92	a
223.	51,64	5,7681	13,285	13,285	3,44E-05	-0,5699	0,9331	37,13	59,43	a
224.	51,86	5,7640	13,342	13,342	3,45E-05	-0,5740	0,9209	36,64	59,87	a
225.	52,10	5,7610	13,400	13,400	3,47E-05	-0,5770	0,9197	36,59	59,92	a
226.	52,32	5,7582	13,457	13,457	3,48E-05	-0,5798	0,9204	36,62	59,89	a
227.	52,54	5,7551	13,511	13,511	3,49E-05	-0,5829	0,9167	36,47	60,02	a
228.	52,77	5,7518	13,569	13,569	3,50E-05	-0,5862	0,9128	36,32	60,16	a
229.	52,99	5,7480	13,624	13,624	3,51E-05	-0,5900	0,9022	35,90	60,54	a
230.	53,21	5,7445	13,680	13,680	3,53E-05	-0,5935	0,8956	35,63	60,78	a
231.	53,44	5,7411	13,738	13,738	3,54E-05	-0,5969	0,8906	35,43	60,96	a
232.	53,68	5,7387	13,797	13,797	3,55E-05	-0,5993	0,8960	35,65	60,77	a
233.	53,91	5,7364	13,852	13,852	3,56E-05	-0,6016	0,9007	35,84	60,60	a
234.	54,13	5,7332	13,908	13,908	3,57E-05	-0,6048	0,8964	35,67	60,75	a
235.	54,35	5,7295	13,965	13,965	3,59E-05	-0,6085	0,8883	35,34	61,04	a
236.	54,57	5,7257	14,020	14,020	3,60E-05	-0,6123	0,8780	34,94	61,41	a
237.	54,80	5,7217	14,078	14,078	3,61E-05	-0,6163	0,8671	34,50	61,80	a
238.	55,04	5,7183	14,137	14,137	3,62E-05	-0,6197	0,8627	34,33	61,95	a
239.	55,27	5,7143	14,192	14,192	3,63E-05	-0,6237	0,8505	33,84	62,38	a
240.	55,49	5,7102	14,250	14,250	3,65E-05	-0,6278	0,8391	33,39	62,78	a
241.	55,72	5,7066	14,308	14,308	3,66E-05	-0,6314	0,8319	33,10	63,03	a
242.	55,94	5,7036	14,361	14,361	3,67E-05	-0,6344	0,8286	32,97	63,15	a
243.	56,18	5,7007	14,419	14,419	3,68E-05	-0,6373	0,8289	32,98	63,14	a
244.	56,40	5,6973	14,476	14,476	3,69E-05	-0,6407	0,8236	32,77	63,33	a
245.	56,63	5,6944	14,533	14,533	3,70E-05	-0,6436	0,8229	32,74	63,35	a
246.	56,87	5,6909	14,592	14,592	3,72E-05	-0,6471	0,8178	32,54	63,53	a
247.	57,10	5,6873	14,651	14,651	3,73E-05	-0,6507	0,8114	32,28	63,75	a
248.	57,34	5,6837	14,710	14,710	3,74E-05	-0,6543	0,8049	32,02	63,98	a
249.	57,57	5,6799	14,769	14,769	3,75E-05	-0,6581	0,7968	31,70	64,26	a
250.	57,80	5,6765	14,825	14,825	3,77E-05	-0,6615	0,7907	31,46	64,47	a
251.	58,03	5,6730	14,884	14,884	3,78E-05	-0,6650	0,7854	31,25	64,66	a
252.	58,26	5,6696	14,942	14,942	3,79E-05	-0,6684	0,7805	31,05	64,82	a
253.	58,49	5,6657	14,997	14,997	3,80E-05	-0,6723	0,7690	30,60	65,22	a
254.	58,71	5,6619	15,055	15,055	3,81E-05	-0,6761	0,7602	30,25	65,52	a
255.	58,93	5,6581	15,108	15,108	3,83E-05	-0,6799	0,7494	29,82	65,89	a
256.	59,16	5,6541	15,167	15,167	3,84E-05	-0,6839	0,7388	29,40	66,25	a
257.	59,39	5,6502	15,223	15,223	3,85E-05	-0,6878	0,7281	28,97	66,62	a
258.	59,63	5,6458	15,283	15,283	3,86E-05	-0,6922	0,7143	28,42	67,09	a
259.	59,87	5,6418	15,341	15,341	3,87E-05	-0,6962	0,7038	28,00	67,44	a
260.	60,10	5,6388	15,401	15,401	3,89E-05	-0,6992	0,7036	28,00	67,45	a
261.	60,34	5,6363	15,458	15,458	3,90E-05	-0,7017	0,7073	28,14	67,32	a
262.	60,58	5,6328	15,517	15,517	3,91E-05	-0,7052	0,7019	27,93	67,51	a
263.	60,81	5,6292	15,578	15,578	3,92E-05	-0,7088	0,6966	27,72	67,69	a
264.	61,04	5,6249	15,637	15,637	3,94E-05	-0,7131	0,6832	27,18	68,14	a
265.	61,27	5,6214	15,693	15,693	3,95E-05	-0,7166	0,6765	26,92	68,36	a
266.	61,50	5,6183	15,752	15,752	3,96E-05	-0,7197	0,6749	26,85	68,42	a
267.	61,73	5,6152	15,809	15,809	3,97E-05	-0,7228	0,6728	26,77	68,49	a
268.	61,96	5,6114	15,865	15,865	3,98E-05	-0,7266	0,6629	26,38	68,82	a
269.	62,20	5,6077	15,924	15,924	4,00E-05	-0,7303	0,6557	26,09	69,06	a
270.	62,42	5,6038	15,982	15,982	4,01E-05	-0,7342	0,6456	25,69	69,40	a
271.	62,65	5,6001	16,039	16,039	4,02E-05	-0,7379	0,6375	25,36	69,67	a
272.	62,88	5,5965	16,096	16,096	4,03E-05	-0,7415	0,6303	25,08	69,91	a
273.	63,11	5,5926	16,154	16,154	4,05E-05	-0,7454	0,6203	24,68	70,24	a
274.	63,34	5,5888	16,211	16,211	4,06E-05	-0,7492	0,6113	24,32	70,54	a
275.	63,57	5,5853	16,269	16,269	4,07E-05	-0,7527	0,6054	24,09	70,73	a
276.	63,80	5,5822	16,326	16,326	4,08E-05	-0,7558	0,6030	23,99	70,81	a
277.	64,03	5,5783	16,384	16,384	4,09E-05	-0,7597	0,5930	23,60	71,14	a
278.	64,26	5,5742	16,442	16,442	4,11E-05	-0,7638	0,5812	23,13	71,53	a
279.	64,49	5,5700	16,499	16,499	4,12E-05	-0,7680	0,5682	22,61	71,96	a
280.	64,72	5,5667	16,556	16,556	4,13E-05	-0,7713	0,5639	22,44	72,10	a
281.	64,95	5,5629	16,614	16,614	4,14E-05	-0,7751	0,5549	22,08	72,39	a
282.	65,18	5,5591	16,671	16,671	4,15E-05	-0,7789	0,5458	21,72	72,69	a
283.	65,41	5,5548	16,729	16,729	4,17E-05	-0,7832	0,5319	21,16	73,15	a
284.	65,65	5,5505	16,787	16,787	4,18E-05	-0,7875	0,5182	20,62	73,59	a
285.	65,87	5,5455	16,844	16,844	4,19E-05	-0,7925	0,4970	19,78	74,28	a
286.	66,10	5,5407	16,901	16,901	4,20E-05	-0,7973	0,4783	19,03	74,89	a
287.	66,33	5,5350	16,959	16,959	4,21E-05	-0,8030	0,4505	17,92	75,79	a
288.	66,56	5,5286	17,016	17,016	4,23E-05	-0,8094	0,4161	16,55	76,89	a
289.	66,79	5,5218	17,072	17,072	4,24E-05	-0,8162	0,3768	14,99	78,15	a
290.	67,02	5,5137	17,131	17,131	4,25E-05	-0,8243	0,3264	12,99	79,75	a
291.	67,25	5,5062	17,189	17,189	4,26E-05	-0,8318	0,2811	11,18	81,19	a
292.	67,48	5,4986	17,246	17,246	4,28E-05	-0,8394	0,2348	9,34	82,65	a
293.	67,71	5,4928	17,304	17,304	4,29E-05	-0,8452	0,2061	8,20	83,55	a
294.	67,94	5,4876	17,361	17,361	4,30E-05	-0,8504	0,1834	7,30	84,26	a
295.	68,17	5,4831	17,419	17,419	4,31E-05	-0,8549	0,1673	6,66	84,77	a
296.	68,40	5,4785	17,476	17,476	4,32E-05	-0,8595	0,1502	5,98	85,30	a
297.	68,63	5,4741	17,532	17,532	4,34E-05	-0,8639	0,1346	5,36	85,79	a

298.	68,87	5,4701	17,591	17,591	4,35E-05	-0,8679	0,1246	4,96	86,11	a
299.	69,09	5,4665	17,648	17,648	4,36E-05	-0,8715	0,1173	4,67	86,33	a
300.	69,32	5,4625	17,706	17,706	4,37E-05	-0,8755	0,1066	4,24	86,67	a
301.	69,55	5,4585	17,763	17,763	4,38E-05	-0,8795	0,0953	3,79	87,02	a
302.	69,78	5,4548	17,821	17,821	4,40E-05	-0,8832	0,0873	3,47	87,27	a
303.	70,01	5,4508	17,879	17,879	4,41E-05	-0,8872	0,0766	3,05	87,61	a
304.	70,24	5,4473	17,936	17,936	4,42E-05	-0,8907	0,0702	2,79	87,81	a
305.	70,47	5,4436	17,992	17,992	4,43E-05	-0,8944	0,0613	2,44	88,08	a
306.	70,70	5,4403	18,051	18,051	4,44E-05	-0,8977	0,0581	2,31	88,18	a
307.	70,93	5,4367	18,107	18,107	4,46E-05	-0,9013	0,0504	2,01	88,43	a
308.	71,16	5,4337	18,165	18,165	4,47E-05	-0,9043	0,0495	1,97	88,45	a
309.	71,39	5,4307	18,224	18,224	4,48E-05	-0,9073	0,0488	1,94	88,48	a
310.	71,62	5,4276	18,281	18,281	4,49E-05	-0,9104	0,0463	1,84	88,55	a
311.	71,85	5,4247	18,338	18,338	4,50E-05	-0,9133	0,0459	1,83	88,57	a
312.	72,08	5,4218	18,396	18,396	4,52E-05	-0,9162	0,0458	1,82	88,57	a
313.	72,31	5,4186	18,454	18,454	4,53E-05	-0,9194	0,0430	1,71	88,66	a
314.	72,54	5,4152	18,510	18,510	4,54E-05	-0,9228	0,0373	1,48	88,83	a
315.	72,77	5,4122	18,568	18,568	4,55E-05	-0,9258	0,0363	1,44	88,87	a
316.	73,00	5,4089	18,626	18,626	4,57E-05	-0,9291	0,0322	1,28	88,99	a
317.	73,23	5,4062	18,683	18,683	4,58E-05	-0,9318	0,0340	1,35	88,94	a
318.	73,46	5,4034	18,739	18,739	4,59E-05	-0,9346	0,0339	1,35	88,94	a
319.	73,69	5,4006	18,796	18,796	4,60E-05	-0,9374	0,0346	1,38	88,92	a
320.	73,92	5,3973	18,855	18,855	4,61E-05	-0,9407	0,0311	1,24	89,03	a
321.	74,18	5,3940	18,917	18,917	4,63E-05	-0,9440	0,0289	1,15	89,10	a
322.	74,40	5,3907	18,975	18,975	4,64E-05	-0,9473	0,0253	1,01	89,21	a
323.	74,63	5,3878	19,033	19,033	4,65E-05	-0,9502	0,0253	1,01	89,21	a
324.	74,86	5,3848	19,088	19,088	4,66E-05	-0,9532	0,0230	0,92	89,28	a
325.	75,11	5,3813	19,151	19,151	4,68E-05	-0,9567	0,0192	0,76	89,40	a
326.	75,34	5,3783	19,210	19,210	4,69E-05	-0,9597	0,0192	0,76	89,40	a
327.	75,57	5,3751	19,266	19,266	4,70E-05	-0,9629	0,0152	0,60	89,53	a
328.	75,80	5,3721	19,325	19,325	4,71E-05	-0,9659	0,0148	0,59	89,54	a
329.	76,03	5,3689	19,383	19,383	4,72E-05	-0,9691	0,0116	0,46	89,64	a
330.	76,27	5,3662	19,440	19,440	4,74E-05	-0,9718	0,0134	0,53	89,58	a
331.	76,49	5,3634	19,498	19,498	4,75E-05	-0,9746	0,0142	0,56	89,56	a
332.	76,72	5,3608	19,555	19,555	4,76E-05	-0,9772	0,0169	0,67	89,47	a
333.	76,96	5,3585	19,614	19,614	4,77E-05	-0,9795	0,0229	0,91	89,28	a
334.	77,19	5,3560	19,673	19,673	4,79E-05	-0,9820	0,0274	1,09	89,15	a
335.	77,42	5,3536	19,730	19,730	4,80E-05	-0,9844	0,0321	1,28	89,00	a
336.	77,65	5,3511	19,788	19,788	4,81E-05	-0,9869	0,0359	1,43	88,88	a
337.	77,90	5,3485	19,848	19,848	4,82E-05	-0,9895	0,0400	1,59	88,75	a
338.	78,13	5,3463	19,908	19,908	4,83E-05	-0,9917	0,0478	1,90	88,51	a
339.	78,36	5,3436	19,964	19,964	4,85E-05	-0,9944	0,0487	1,94	88,48	a
340.	100,12	5,4025	19,621	19,621	0	-0,9355	0,4581	18,23	75,54	r
341.	100,35	5,4103	19,567	19,567	-0,00300	-0,9277	0,5111	20,34	73,82	r
342.	100,58	5,4185	19,508	19,508	-0,00299	-0,9195	0,5626	22,39	72,14	r
343.	100,80	5,4262	19,452	19,452	-0,00299	-0,9118	0,6106	24,30	70,56	r
344.	101,03	5,4344	19,394	19,394	-0,00298	-0,9036	0,6625	26,36	68,83	r
345.	101,27	5,4426	19,334	19,334	-0,00297	-0,8954	0,7133	28,38	67,12	r
346.	101,49	5,4501	19,278	19,278	-0,00296	-0,8879	0,7598	30,23	65,54	r
347.	101,72	5,4574	19,222	19,222	-0,00295	-0,8806	0,8038	31,98	64,02	r
348.	101,95	5,4648	19,165	19,165	-0,00294	-0,8732	0,8484	33,76	62,45	r
349.	102,18	5,4728	19,108	19,108	-0,00293	-0,8652	0,8989	35,76	60,66	r
350.	102,40	5,4800	19,051	19,051	-0,00292	-0,8580	0,9411	37,45	59,14	r
351.	102,63	5,4878	18,994	18,994	-0,00292	-0,8502	0,9897	39,38	57,35	r
352.	102,86	5,4956	18,937	18,937	-0,00291	-0,8424	1,0381	41,30	55,54	r
353.	103,10	5,5026	18,877	18,877	-0,00290	-0,8354	1,0777	42,88	54,03	r
354.	103,33	5,5102	18,821	18,821	-0,00289	-0,8278	1,1245	44,74	52,20	r
355.	103,56	5,5176	18,763	18,763	-0,00288	-0,8204	1,1685	46,49	50,44	r
356.	103,82	5,5250	18,702	18,702	-0,00287	-0,8130	1,2112	48,19	48,69	r
357.	104,04	5,5324	18,644	18,644	-0,00286	-0,8056	1,2553	49,95	46,83	r
358.	104,28	5,5395	18,583	18,583	-0,00285	-0,7985	1,2952	51,53	45,10	r
359.	104,51	5,5459	18,524	18,524	-0,00284	-0,7921	1,3288	52,87	43,59	r
360.	104,75	5,5527	18,465	18,465	-0,00283	-0,7853	1,3668	54,38	41,84	r
361.	105,00	5,5595	18,405	18,405	-0,00283	-0,7785	1,4036	55,85	40,09	r
362.	105,22	5,5662	18,350	18,350	-0,00282	-0,7718	1,4424	57,39	38,17	r
363.	105,45	5,5726	18,289	18,289	-0,00281	-0,7654	1,4754	58,71	36,47	r
364.	105,69	5,5783	18,231	18,231	-0,00280	-0,7597	1,5026	59,79	35,01	r
365.	105,92	5,5846	18,175	18,175	-0,00279	-0,7534	1,5368	61,15	33,11	r
366.	106,15	5,5901	18,116	18,116	-0,00278	-0,7479	1,5618	62,14	31,65	r
367.	106,38	5,5959	18,058	18,058	-0,00277	-0,7421	1,5901	63,27	29,92	r
368.	106,63	5,6020	17,998	17,998	-0,00276	-0,7360	1,6207	64,49	27,95	r
369.	106,87	5,6075	17,934	17,934	-0,00275	-0,7305	1,6434	65,39	26,39	r
370.	107,11	5,6127	17,875	17,875	-0,00274	-0,7253	1,6654	66,26	24,81	r
371.	107,34	5,6174	17,817	17,817	-0,00274	-0,7206	1,6829	66,96	23,47	r
372.	107,57	5,6222	17,759	17,759	-0,00273	-0,7158	1,7016	67,71	21,96	r
373.	107,82	5,6269	17,699	17,699	-0,00272	-0,7111	1,7183	68,37	20,52	r
374.	108,06	5,6313	17,640	17,640	-0,00271	-0,7067	1,7324	68,93	19,23	r
375.	108,32	5,6360	17,577	17,577	-0,00270	-0,7020	1,7475	69,53	17,73	r
376.	108,56	5,6399	17,516	17,516	-0,00269	-0,6981	1,7557	69,86	16,87	r
377.	108,78	5,6435	17,458	17,458	-0,00268	-0,6945	1,7624	70,12	16,14	r
378.	109,02	5,6467	17,398	17,398	-0,00267	-0,6913	1,7645	70,21	15,90	r
379.	109,24	5,6500	17,343	17,343	-0,00266	-0,6880	1,7700	70,42	15,26	r
380.	109,48	5,6530	17,283	17,283	-0,00265	-0,6850	1,7699	70,42	15,27	r
381.	109,71	5,6558	17,227	17,227	-0,00264	-0,6822	1,7695	70,41	15,32	r
382.	109,94	5,6589	17,168	17,168	-0,00264	-0,6791	1,7711	70,47	15,13	r
383.	110,17	5,6617	17,110	17,110	-0,00263	-0,6763	1,7703	70,44	15,22	r
384.	110,40	5,6643	17,053	17,053	-0,00262	-0,6737	1,7678	70,34	15,51	r
385.	110,63	5,6675	16,996	16,996	-0,00261	-0,6705	1,7710	70,47	15,14	r
386.	110,87	5,6703	16,936	16,936	-0,00260	-0,6677	1,7690	70,39	15,38	r
387.	111,10	5,6731	16,879	16,879	-0,00259	-0,6649	1,7685	70,37	15,43	r
388.	111,33	5,6761	16,822	16,822	-0,00258	-0,6619	1,7699	70,42	15,28	r
389.	111,55	5,6788	16,765	16,765	-0,00257	-0,6592	1,7684	70,36	15,45	r
390.	111,78	5,6817	16,708	16,708	-0,00257	-0,6563	1,7687	70,37	15,42	r
391.	112,02	5,6848	16,648	16,648	-0,00256	-0,6532	1,7699	70,42	15,27	r
392.	112,25	5,6875	16,590	16,590	-0,00255	-0,6505	1,7676	70,33	15,54	r
393.	112,48	5,6908	16,533	16,533	-0,00254	-0,6472	1,7719	70,50	15,03	r
394.	112,73	5,6935	16,471	16,471	-0,00253	-0,6445	1,7682	70,36	15,47	r
395.	112,95	5,6964	16,416	16,416	-0,00252	-0,6416	1,7696	70,41	15,31	r
396.	113,19	5,6993	16,356	16,356	-0,00251	-0,6387	1,7687	70,37	15,41	r
397.	113,42	5,7020	16,298	16,298	-0,00250	-0,6360	1,7666	70,29	15,65	r
398.	113,65	5,7050	16,240	16,240	-0,00249	-0,6330	1,7673	70,32	15,57	r
399.	113,88	5,7076	16,183	16,183	-0,00249	-0,6304	1,7651	70,23	15,83	r
400.	114,11	5,7107	16,127	16,127	-0,00248	-0,6273	1,7681	70,35	15,48	r

401.	114,35	5,7137	16,068	16,068	-0,00247	-0,6243	1,7682	70,35	15,47	r
402.	114,59	5,7166	16,006	16,006	-0,00246	-0,6214	1,7661	70,27	15,71	r
403.	114,84	5,7199	15,946	15,946	-0,00245	-0,6181	1,7694	70,40	15,33	r
404.	115,08	5,7226	15,884	15,884	-0,00244	-0,6154	1,7652	70,23	15,82	r
405.	115,30	5,7253	15,830	15,830	-0,00243	-0,6127	1,7652	70,24	15,82	r
406.	115,52	5,7280	15,773	15,773	-0,00242	-0,6100	1,7636	70,17	16,01	r
407.	115,75	5,7310	15,716	15,716	-0,00241	-0,6070	1,7650	70,23	15,84	r
408.	115,99	5,7340	15,659	15,659	-0,00240	-0,6040	1,7666	70,29	15,66	r
409.	116,23	5,7370	15,596	15,596	-0,00240	-0,6010	1,7649	70,23	15,85	r
410.	116,46	5,7399	15,539	15,539	-0,00239	-0,5981	1,7653	70,24	15,81	r
411.	116,69	5,7425	15,480	15,480	-0,00238	-0,5955	1,7622	70,12	16,16	r
412.	116,93	5,7454	15,421	15,421	-0,00237	-0,5926	1,7617	70,10	16,22	r
413.	117,16	5,7485	15,365	15,365	-0,00236	-0,5895	1,7643	70,20	15,92	r
414.	117,40	5,7515	15,304	15,304	-0,00235	-0,5865	1,7639	70,19	15,96	r
415.	117,64	5,7545	15,244	15,244	-0,00234	-0,5835	1,7640	70,19	15,96	r
416.	117,88	5,7577	15,183	15,183	-0,00233	-0,5803	1,7652	70,23	15,82	r
417.	118,12	5,7604	15,127	15,127	-0,00232	-0,5776	1,7645	70,21	15,90	r
418.	118,34	5,7632	15,067	15,067	-0,00231	-0,5748	1,7624	70,12	16,14	r
419.	118,57	5,7660	15,011	15,011	-0,00231	-0,5720	1,7623	70,12	16,15	r
420.	118,80	5,7690	14,956	14,956	-0,00230	-0,5690	1,7646	70,21	15,89	r
421.	119,03	5,7721	14,896	14,896	-0,00229	-0,5659	1,7654	70,24	15,80	r
422.	119,27	5,7751	14,835	14,835	-0,00228	-0,5629	1,7652	70,24	15,82	r
423.	119,50	5,7777	14,781	14,781	-0,00227	-0,5603	1,7638	70,18	15,98	r
424.	119,73	5,7807	14,721	14,721	-0,00226	-0,5573	1,7641	70,19	15,95	r
425.	119,97	5,7836	14,662	14,662	-0,00225	-0,5544	1,7635	70,17	16,02	r
426.	120,20	5,7864	14,604	14,604	-0,00224	-0,5516	1,7622	70,12	16,16	r
427.	120,44	5,7897	14,544	14,544	-0,00223	-0,5483	1,7654	70,24	15,80	r
428.	120,68	5,7926	14,484	14,484	-0,00222	-0,5454	1,7640	70,19	15,95	r
429.	120,92	5,7955	14,424	14,424	-0,00222	-0,5425	1,7634	70,16	16,03	r
430.	121,16	5,7983	14,364	14,364	-0,00221	-0,5397	1,7614	70,08	16,25	r
431.	121,39	5,8013	14,307	14,307	-0,00220	-0,5367	1,7626	70,13	16,12	r
432.	121,62	5,8039	14,250	14,250	-0,00219	-0,5341	1,7600	70,03	16,40	r
433.	121,86	5,8071	14,191	14,191	-0,00218	-0,5309	1,7627	70,14	16,10	r
434.	122,10	5,8101	14,129	14,129	-0,00217	-0,5279	1,7615	70,09	16,24	r
435.	122,34	5,8133	14,070	14,070	-0,00216	-0,5247	1,7639	70,18	15,97	r
436.	122,57	5,8161	14,011	14,011	-0,00215	-0,5219	1,7623	70,12	16,15	r
437.	122,80	5,8190	13,954	13,954	-0,00214	-0,5190	1,7630	70,15	16,07	r
438.	123,03	5,8220	13,897	13,897	-0,00213	-0,5160	1,7643	70,20	15,92	r
439.	123,27	5,8247	13,836	13,836	-0,00213	-0,5133	1,7610	70,07	16,29	r
440.	123,50	5,8275	13,779	13,779	-0,00212	-0,5105	1,7604	70,04	16,36	r
441.	123,73	5,8305	13,722	13,722	-0,00211	-0,5075	1,7618	70,10	16,21	r
442.	123,96	5,8335	13,666	13,666	-0,00210	-0,5045	1,7637	70,18	15,99	r
443.	124,19	5,8362	13,609	13,609	-0,00209	-0,5018	1,7622	70,12	16,16	r
444.	124,42	5,8392	13,550	13,550	-0,00208	-0,4988	1,7624	70,12	16,14	r
445.	124,65	5,8422	13,494	13,494	-0,00207	-0,4958	1,7645	70,21	15,90	r
446.	124,88	5,8450	13,434	13,434	-0,00206	-0,4930	1,7624	70,12	16,14	r
447.	125,11	5,8479	13,377	13,377	-0,00206	-0,4901	1,7630	70,15	16,07	r
448.	125,35	5,8509	13,318	13,318	-0,00205	-0,4871	1,7632	70,16	16,04	r
449.	125,58	5,8537	13,260	13,260	-0,00204	-0,4843	1,7622	70,12	16,15	r
450.	125,81	5,8567	13,202	13,202	-0,00203	-0,4813	1,7631	70,15	16,06	r
451.	126,05	5,8596	13,142	13,142	-0,00202	-0,4784	1,7625	70,13	16,13	r
452.	126,28	5,8624	13,083	13,083	-0,00201	-0,4756	1,7610	70,07	16,29	r
453.	126,51	5,8653	13,028	13,028	-0,00200	-0,4727	1,7624	70,12	16,13	r
454.	126,74	5,8684	12,969	12,969	-0,00199	-0,4696	1,7638	70,18	15,98	r
455.	126,98	5,8712	12,909	12,909	-0,00198	-0,4668	1,7616	70,09	16,23	r
456.	127,21	5,8742	12,852	12,852	-0,00197	-0,4638	1,7628	70,14	16,09	r
457.	127,43	5,8772	12,798	12,798	-0,00197	-0,4608	1,7659	70,26	15,74	r
458.	127,67	5,8800	12,737	12,737	-0,00196	-0,4580	1,7635	70,17	16,01	r
459.	127,90	5,8829	12,680	12,680	-0,00195	-0,4551	1,7638	70,18	15,98	r
460.	128,15	5,8859	12,618	12,618	-0,00194	-0,4521	1,7627	70,14	16,10	r
461.	128,38	5,8887	12,561	12,561	-0,00193	-0,4493	1,7624	70,12	16,14	r
462.	128,61	5,8918	12,503	12,503	-0,00192	-0,4462	1,7641	70,19	15,94	r
463.	128,85	5,8948	12,443	12,443	-0,00191	-0,4432	1,7643	70,20	15,92	r
464.	129,08	5,8978	12,384	12,384	-0,00190	-0,4402	1,7646	70,21	15,89	r
465.	129,32	5,9007	12,325	12,325	-0,00189	-0,4373	1,7643	70,20	15,93	r
466.	129,56	5,9038	12,265	12,265	-0,00189	-0,4342	1,7651	70,23	15,83	r
467.	129,79	5,9065	12,206	12,206	-0,00188	-0,4315	1,7628	70,14	16,09	r
468.	130,02	5,9095	12,149	12,149	-0,00187	-0,4285	1,7642	70,20	15,93	r
469.	130,25	5,9126	12,093	12,093	-0,00186	-0,4254	1,7671	70,31	15,60	r
470.	130,48	5,9153	12,037	12,037	-0,00185	-0,4227	1,7660	70,27	15,73	r
471.	130,71	5,9181	11,978	11,978	-0,00184	-0,4199	1,7643	70,20	15,92	r
472.	130,93	5,9210	11,923	11,923	-0,00183	-0,4170	1,7659	70,26	15,74	r
473.	131,16	5,9238	11,866	11,866	-0,00182	-0,4142	1,7651	70,23	15,83	r
474.	131,39	5,9266	11,807	11,807	-0,00181	-0,4114	1,7636	70,17	16,00	r
475.	131,62	5,9297	11,752	11,752	-0,00181	-0,4083	1,7671	70,31	15,60	r
476.	131,86	5,9327	11,691	11,691	-0,00180	-0,4053	1,7664	70,28	15,68	r
477.	132,09	5,9357	11,634	11,634	-0,00179	-0,4023	1,7678	70,34	15,52	r
478.	132,32	5,9385	11,577	11,577	-0,00178	-0,3995	1,7673	70,32	15,57	r
479.	132,56	5,9416	11,516	11,516	-0,00177	-0,3964	1,7678	70,34	15,52	r
480.	132,81	5,9447	11,455	11,455	-0,00176	-0,3933	1,7683	70,36	15,46	r
481.	133,06	5,9477	11,391	11,391	-0,00175	-0,3903	1,7662	70,27	15,71	r
482.	133,30	5,9505	11,332	11,332	-0,00174	-0,3875	1,7648	70,22	15,87	r
483.	133,53	5,9536	11,275	11,275	-0,00173	-0,3844	1,7671	70,31	15,60	r
484.	133,76	5,9563	11,218	11,218	-0,00172	-0,3817	1,7656	70,25	15,77	r
485.	133,98	5,9591	11,160	11,160	-0,00172	-0,3789	1,7646	70,21	15,89	r
486.	134,21	5,9621	11,102	11,102	-0,00171	-0,3759	1,7658	70,26	15,76	r
487.	134,44	5,9651	11,045	11,045	-0,00170	-0,3729	1,7669	70,30	15,62	r
488.	134,66	5,9679	10,989	10,989	-0,00169	-0,3701	1,7669	70,30	15,62	r
489.	134,89	5,9706	10,933	10,933	-0,00168	-0,3674	1,7662	70,28	15,70	r
490.	135,12	5,9733	10,878	10,878	-0,00167	-0,3647	1,7653	70,24	15,81	r
491.	135,36	5,9766	10,817	10,817	-0,00166	-0,3614	1,7679	70,34	15,51	r
492.	135,61	5,9797	10,758	10,758	-0,00165	-0,3583	1,7691	70,39	15,36	r
493.	135,83	5,9826	10,697	10,697	-0,00164	-0,3554	1,7680	70,35	15,49	r
494.	136,06	5,9854	10,640	10,640	-0,00164	-0,3526	1,7673	70,32	15,58	r
495.	136,29	5,9882	10,583	10,583	-0,00163	-0,3498	1,7669	70,30	15,63	r
496.	136,52	5,9913	10,526	10,526	-0,00162	-0,3467	1,7692	70,39	15,35	r
497.	136,76	5,9943	10,467	10,467	-0,00161	-0,3437	1,7694	70,40	15,33	r
498.	137,00	5,9973	10,405	10,405	-0,00160	-0,3407	1,7686	70,37	15,42	r
499.	137,23	6,0004	10,347	10,347	-0,00159	-0,3376	1,7706	70,45	15,19	r
500.	137,46	6,0031	10,291	10,291	-0,00158	-0,3349	1,7694	70,40	15,33	r
501.	137,69	6,0058	10,233	10,233	-0,00157	-0,3322	1,7677	70,34	15,53	r
502.	137,91	6,0089	10,179	10,179	-0,00157	-0,3291	1,7713	70,48	15,11	r
503.	138,14	6,0117	10,121	10,121	-0,00156	-0,3263	1,7704	70,44	15,21	r

504.	138,37	6,0145	10,066	10,066	-0,00155	-0,3235	1,7706	70,45	15,19	r
505.	138,59	6,0174	10,009	10,009	-0,00154	-0,3206	1,7712	70,48	15,11	r
506.	138,83	6,0204	9,949	9,949	-0,00153	-0,3176	1,7710	70,47	15,14	r
507.	139,05	6,0231	9,893	9,893	-0,00152	-0,3149	1,7700	70,42	15,26	r
508.	139,30	6,0264	9,834	9,834	-0,00151	-0,3116	1,7735	70,56	14,84	r
509.	139,54	6,0292	9,771	9,771	-0,00150	-0,3088	1,7703	70,44	15,23	r
510.	139,78	6,0322	9,716	9,716	-0,00149	-0,3058	1,7723	70,52	14,99	r
511.	140,00	6,0352	9,657	9,657	-0,00149	-0,3028	1,7727	70,54	14,93	r
512.	140,24	6,0380	9,596	9,596	-0,00148	-0,3000	1,7705	70,45	15,20	r
513.	140,47	6,0410	9,540	9,540	-0,00147	-0,2970	1,7723	70,52	14,99	r
514.	140,71	6,0440	9,480	9,480	-0,00146	-0,2940	1,7723	70,52	14,99	r
515.	140,93	6,0468	9,424	9,424	-0,00145	-0,2912	1,7725	70,53	14,96	r
516.	141,16	6,0499	9,365	9,365	-0,00144	-0,2881	1,7737	70,57	14,82	r
517.	141,39	6,0527	9,308	9,308	-0,00143	-0,2853	1,7732	70,55	14,88	r
518.	141,62	6,0556	9,250	9,250	-0,00142	-0,2824	1,7732	70,55	14,87	r
519.	141,85	6,0584	9,193	9,193	-0,00141	-0,2796	1,7728	70,54	14,92	r
520.	142,08	6,0615	9,135	9,135	-0,00141	-0,2765	1,7747	70,61	14,69	r
521.	142,31	6,0645	9,077	9,077	-0,00140	-0,2735	1,7757	70,65	14,57	r
522.	142,54	6,0673	9,022	9,022	-0,00139	-0,2707	1,7758	70,66	14,56	r
523.	142,79	6,0707	8,960	8,960	-0,00138	-0,2673	1,7790	70,78	14,15	r
524.	143,02	6,0734	8,902	8,902	-0,00137	-0,2646	1,7767	70,69	14,44	r
525.	143,25	6,0763	8,843	8,843	-0,00136	-0,2617	1,7761	70,67	14,52	r
526.	143,48	6,0792	8,785	8,785	-0,00135	-0,2588	1,7764	70,68	14,48	r
527.	143,71	6,0822	8,730	8,730	-0,00134	-0,2558	1,7785	70,76	14,22	r
528.	143,94	6,0849	8,670	8,670	-0,00133	-0,2531	1,7758	70,66	14,55	r
529.	144,17	6,0879	8,613	8,613	-0,00133	-0,2501	1,7772	70,71	14,38	r
530.	144,40	6,0911	8,557	8,557	-0,00132	-0,2469	1,7811	70,87	13,89	r
531.	144,63	6,0939	8,498	8,498	-0,00131	-0,2441	1,7796	70,81	14,08	r
532.	144,88	6,0971	8,438	8,438	-0,00130	-0,2409	1,7813	70,87	13,86	r
533.	145,11	6,0999	8,378	8,378	-0,00129	-0,2381	1,7794	70,80	14,10	r
534.	145,34	6,1027	8,322	8,322	-0,00128	-0,2353	1,7795	70,80	14,09	r
535.	145,57	6,1056	8,263	8,263	-0,00127	-0,2324	1,7788	70,78	14,18	r
536.	145,80	6,1086	8,206	8,206	-0,00126	-0,2294	1,7802	70,83	14,00	r
537.	146,03	6,1115	8,148	8,148	-0,00125	-0,2265	1,7803	70,83	13,99	r
538.	146,26	6,1145	8,091	8,091	-0,00125	-0,2235	1,7814	70,88	13,84	r
539.	146,49	6,1171	8,034	8,034	-0,00124	-0,2209	1,7790	70,78	14,16	r
540.	146,72	6,1202	7,976	7,976	-0,00123	-0,2178	1,7809	70,86	13,91	r
541.	146,95	6,1230	7,920	7,920	-0,00122	-0,2150	1,7810	70,86	13,90	r
542.	147,18	6,1262	7,861	7,861	-0,00121	-0,2118	1,7832	70,95	13,60	r
543.	147,41	6,1288	7,803	7,803	-0,00120	-0,2092	1,7805	70,85	13,95	r
544.	147,64	6,1319	7,747	7,747	-0,00119	-0,2061	1,7835	70,97	13,56	r
545.	147,87	6,1351	7,689	7,689	-0,00118	-0,2029	1,7861	71,06	13,22	r
546.	148,10	6,1378	7,631	7,631	-0,00118	-0,2002	1,7840	70,99	13,49	r
547.	148,34	6,1409	7,572	7,572	-0,00117	-0,1971	1,7857	71,05	13,27	r
548.	148,57	6,1439	7,514	7,514	-0,00116	-0,1941	1,7864	71,08	13,18	r
549.	148,80	6,1466	7,456	7,456	-0,00115	-0,1914	1,7846	71,01	13,43	r
550.	149,03	6,1497	7,398	7,398	-0,00114	-0,1883	1,7867	71,09	13,13	r
551.	149,26	6,1524	7,341	7,341	-0,00113	-0,1856	1,7849	71,02	13,38	r
552.	149,49	6,1555	7,284	7,284	-0,00112	-0,1825	1,7873	71,11	13,05	r
553.	149,72	6,1584	7,226	7,226	-0,00111	-0,1796	1,7873	71,12	13,05	r
554.	149,95	6,1615	7,168	7,168	-0,00110	-0,1765	1,7893	71,20	12,76	r
555.	150,18	6,1642	7,111	7,111	-0,00110	-0,1738	1,7878	71,13	12,98	r
556.	150,41	6,1673	7,055	7,055	-0,00109	-0,1707	1,7907	71,25	12,57	r
557.	150,64	6,1701	6,998	6,998	-0,00108	-0,1679	1,7900	71,22	12,67	r
558.	150,87	6,1731	6,940	6,940	-0,00107	-0,1649	1,7912	71,27	12,50	r
559.	151,11	6,1759	6,881	6,881	-0,00106	-0,1621	1,7894	71,20	12,75	r
560.	151,33	6,1789	6,824	6,824	-0,00105	-0,1591	1,7909	71,26	12,55	r
561.	151,56	6,1820	6,766	6,766	-0,00104	-0,1560	1,7931	71,34	12,23	r
562.	151,79	6,1848	6,709	6,709	-0,00103	-0,1532	1,7922	71,31	12,36	r
563.	152,02	6,1878	6,651	6,651	-0,00103	-0,1502	1,7933	71,35	12,20	r
564.	152,25	6,1905	6,594	6,594	-0,00102	-0,1475	1,7918	71,29	12,41	r
565.	152,48	6,1936	6,536	6,536	-0,00101	-0,1444	1,7937	71,37	12,14	r
566.	152,71	6,1964	6,479	6,479	-9,99E-04	-0,1416	1,7931	71,34	12,23	r
567.	152,94	6,1994	6,421	6,421	-9,90E-04	-0,1386	1,7943	71,39	12,05	r
568.	153,17	6,2021	6,364	6,364	-9,81E-04	-0,1359	1,7925	71,32	12,31	r
569.	153,40	6,2052	6,306	6,306	-9,72E-04	-0,1328	1,7947	71,41	11,99	r
570.	153,63	6,2081	6,249	6,249	-9,64E-04	-0,1299	1,7951	71,42	11,93	r
571.	153,86	6,2112	6,191	6,191	-9,55E-04	-0,1268	1,7970	71,50	11,64	r
572.	154,09	6,2143	6,134	6,134	-9,46E-04	-0,1237	1,7993	71,59	11,28	r
573.	154,32	6,2171	6,076	6,076	-9,37E-04	-0,1209	1,7985	71,56	11,40	r
574.	154,55	6,2201	6,021	6,021	-9,29E-04	-0,1179	1,8005	71,64	11,08	r
575.	154,78	6,2229	5,961	5,961	-9,20E-04	-0,1151	1,7989	71,57	11,34	r
576.	155,01	6,2258	5,904	5,904	-9,11E-04	-0,1122	1,7991	71,58	11,30	r
577.	155,24	6,2288	5,848	5,848	-9,02E-04	-0,1092	1,8012	71,67	10,97	r
578.	155,47	6,2319	5,790	5,790	-8,93E-04	-0,1061	1,8029	71,73	10,68	r
579.	155,70	6,2347	5,733	5,733	-8,85E-04	-0,1033	1,8025	71,72	10,75	r
580.	155,93	6,2377	5,676	5,676	-8,76E-04	-0,1003	1,8037	71,77	10,54	r
581.	156,16	6,2406	5,617	5,617	-8,67E-04	-0,0974	1,8031	71,74	10,65	r
582.	156,39	6,2438	5,560	5,560	-8,58E-04	-0,0942	1,8065	71,88	10,06	r
583.	156,62	6,2465	5,501	5,501	-8,49E-04	-0,0915	1,8044	71,79	10,43	r
584.	156,85	6,2495	5,446	5,446	-8,41E-04	-0,0885	1,8066	71,88	10,04	r
585.	157,09	6,2526	5,387	5,387	-8,32E-04	-0,0854	1,8078	71,93	9,81	r
586.	157,31	6,2555	5,331	5,331	-8,23E-04	-0,0825	1,8090	71,98	9,60	r
587.	157,55	6,2585	5,270	5,270	-8,14E-04	-0,0795	1,8086	71,96	9,67	r
588.	157,78	6,2616	5,211	5,211	-8,05E-04	-0,0764	1,8101	72,02	9,39	r
589.	158,01	6,2645	5,154	5,154	-7,96E-04	-0,0735	1,8105	72,04	9,32	r
590.	158,24	6,2676	5,098	5,098	-7,87E-04	-0,0704	1,8134	72,15	8,74	r
591.	158,47	6,2704	5,039	5,039	-7,78E-04	-0,0676	1,8119	72,09	9,04	r
592.	158,70	6,2735	4,983	4,983	-7,70E-04	-0,0645	1,8149	72,21	8,43	r
593.	158,93	6,2763	4,924	4,924	-7,61E-04	-0,0617	1,8130	72,14	8,81	r
594.	159,16	6,2794	4,867	4,867	-7,52E-04	-0,0586	1,8154	72,23	8,32	r
595.	159,39	6,2821	4,810	4,810	-7,43E-04	-0,0559	1,8139	72,17	8,63	r
596.	159,62	6,2851	4,752	4,752	-7,34E-04	-0,0529	1,8149	72,21	8,43	r
597.	159,85	6,2880	4,696	4,696	-7,26E-04	-0,0500	1,8157	72,25	8,25	r
598.	160,08	6,2911	4,637	4,637	-7,17E-04	-0,0469	1,8174	72,31	7,86	r
599.	160,33	6,2944	4,577	4,577	-7,08E-04	-0,0436	1,8202	72,43	7,19	r
600.	160,56	6,2972	4,517	4,517	-6,98E-04	-0,0408	1,8182	72,35	7,68	r
601.	160,79	6,3003	4,461	4,461	-6,90E-04	-0,0377	1,8212	72,46	6,94	r
602.	161,02	6,3032	4,402	4,402	-6,81E-04	-0,0348	1,8204	72,43	7,16	r
603.	161,25	6,3061	4,345	4,345	-6,72E-04	-0,0319	1,8208	72,45	7,05	r
604.	161,48	6,3090	4,289	4,289	-6,63E-04	-0,0290	1,8218	72,49	6,78	r
605.	161,72	6,3121	4,229	4,229	-6,54E-04	-0,0259	1,8228	72,53	6,53	r
606.	161,94	6,3149	4,172	4,172	-6,46E-04	-0,0231	1,8225	72,52	6,60	r

607.	162,17	6,3180	4,115	4,115	-6,37E-04	-0,0200	1,8246	72,60	6,01	r
608.	162,40	6,3207	4,057	4,057	-6,28E-04	-0,0173	1,8230	72,53	6,48	r
609.	162,63	6,3237	4,001	4,001	-6,19E-04	-0,0143	1,8249	72,61	5,91	r
610.	162,86	6,3267	3,942	3,942	-6,10E-04	-0,0113	1,8252	72,62	5,84	r
611.	163,09	6,3297	3,885	3,885	-6,01E-04	-0,0083	1,8265	72,67	5,43	r
612.	163,32	6,3328	3,828	3,828	-5,93E-04	-0,0052	1,8288	72,77	4,59	r
613.	163,55	6,3356	3,770	3,770	-5,84E-04	-0,0024	1,8278	72,73	4,95	r
614.	163,78	6,3384	3,713	3,713	-5,75E-04	0,0004	1,8272	72,70	5,18	r
615.	164,01	6,3415	3,656	3,656	-5,67E-04	0,0035	1,8301	72,82	4,07	r
616.	164,24	6,3445	3,597	3,597	-5,57E-04	0,0065	1,8305	72,83	3,89	r
617.	164,47	6,3473	3,539	3,539	-5,49E-04	0,0093	1,8294	72,79	4,34	r
618.	164,70	6,3503	3,483	3,483	-5,40E-04	0,0123	1,8311	72,86	3,60	r
619.	164,93	6,3531	3,425	3,425	-5,31E-04	0,0151	1,8301	72,82	4,04	r
620.	165,16	6,3563	3,367	3,367	-5,22E-04	0,0183	1,8333	72,94	2,24	r
621.	165,39	6,3591	3,310	3,310	-5,13E-04	0,0211	1,8325	72,91	2,83	r
622.	165,62	6,3620	3,254	3,254	-5,05E-04	0,0240	1,8336	72,96	1,98	r
623.	165,85	6,3648	3,196	3,196	-4,96E-04	0,0268	1,8326	72,92	2,72	r
624.	166,08	6,3680	3,137	3,137	-4,87E-04	0,0300	1,8351	73,02	0	r
625.	166,31	6,3711	3,082	3,082	-4,78E-04	0,0331	1,8381	73,14	0	r
626.	166,54	6,3739	3,022	3,022	-4,69E-04	0,0359	1,8365	73,07	0	r
627.	166,77	6,3767	2,967	2,967	-4,61E-04	0,0387	1,8366	73,07	0	r
628.	167,00	6,3797	2,908	2,908	-4,52E-04	0,0417	1,8370	73,09	0	r
629.	167,23	6,3828	2,850	2,850	-4,43E-04	0,0448	1,8391	73,18	0	r
630.	167,46	6,3856	2,793	2,793	-4,34E-04	0,0476	1,8386	73,16	0	r
631.	167,69	6,3887	2,735	2,735	-4,25E-04	0,0507	1,8405	73,23	0	r
632.	167,92	6,3916	2,678	2,678	-4,17E-04	0,0536	1,8407	73,24	0	r
633.	168,15	6,3947	2,620	2,620	-4,08E-04	0,0567	1,8430	73,33	0	r
634.	168,38	6,3973	2,563	2,563	-3,99E-04	0,0593	1,8402	73,22	0	r
635.	168,61	6,4004	2,505	2,505	-3,90E-04	0,0624	1,8422	73,30	0	r
636.	168,84	6,4034	2,449	2,449	-3,82E-04	0,0654	1,8444	73,39	0	r
637.	169,07	6,4065	2,392	2,392	-3,73E-04	0,0685	1,8465	73,47	0	r
638.	169,30	6,4095	2,335	2,335	-3,64E-04	0,0715	1,8478	73,52	0	r
639.	169,53	6,4122	2,276	2,276	-3,55E-04	0,0742	1,8454	73,43	0	r
640.	169,76	6,4154	2,218	2,218	-3,46E-04	0,0774	1,8483	73,54	0	r
641.	170,00	6,4182	2,161	2,161	-3,38E-04	0,0802	1,8481	73,53	0	r
642.	170,22	6,4214	2,103	2,103	-3,29E-04	0,0834	1,8508	73,64	0	r
643.	170,45	6,4242	2,045	2,045	-3,20E-04	0,0862	1,8500	73,61	0	r
644.	170,69	6,4272	1,988	1,988	-3,11E-04	0,0892	1,8510	73,65	0	r
645.	170,91	6,4301	1,931	1,931	-3,02E-04	0,0921	1,8516	73,67	0	r
646.	171,14	6,4331	1,873	1,873	-2,93E-04	0,0951	1,8524	73,70	0	r
647.	171,37	6,4359	1,815	1,815	-2,85E-04	0,0979	1,8518	73,68	0	r
648.	171,60	6,4392	1,760	1,760	-2,76E-04	0,1012	1,8568	73,88	0	r
649.	171,85	6,4422	1,697	1,697	-2,66E-04	0,1042	1,8556	73,83	0	r
650.	172,08	6,4452	1,640	1,640	-2,58E-04	0,1072	1,8566	73,87	0	r
651.	172,31	6,4480	1,580	1,580	-2,49E-04	0,1100	1,8550	73,81	0	r
652.	172,54	6,4513	1,523	1,523	-2,40E-04	0,1133	1,8593	73,98	0	r
653.	172,78	6,4541	1,464	1,464	-2,31E-04	0,1161	1,8577	73,92	0	r
654.	173,01	6,4572	1,407	1,407	-2,22E-04	0,1192	1,8602	74,01	0	r
655.	173,24	6,4601	1,348	1,348	-2,13E-04	0,1221	1,8596	73,99	0	r
656.	173,47	6,4632	1,292	1,292	-2,04E-04	0,1252	1,8627	74,11	0	r
657.	173,70	6,4659	1,234	1,234	-1,95E-04	0,1279	1,8603	74,02	0	r
658.	173,93	6,4688	1,176	1,176	-1,87E-04	0,1308	1,8602	74,02	0	r
659.	174,18	6,4718	1,115	1,115	-1,77E-04	0,1338	1,8598	74,00	0	r
660.	174,40	6,4746	1,058	1,058	-1,69E-04	0,1366	1,8594	73,98	0	r
661.	174,63	6,4775	1,000	1,000	-1,60E-04	0,1395	1,8594	73,98	0	r
662.	174,87	6,4805	0,943	0,943	-1,51E-04	0,1425	1,8607	74,04	0	r
663.	175,10	6,4833	0,885	0,885	-1,42E-04	0,1453	1,8597	74,00	0	r
664.	175,33	6,4863	0,827	0,827	-1,33E-04	0,1483	1,8607	74,04	0	r
665.	175,58	6,4894	0,766	0,766	-1,24E-04	0,1514	1,8610	74,05	0	r
666.	175,81	6,4926	0,707	0,707	-1,15E-04	0,1546	1,8635	74,15	0	r
667.	176,05	6,4957	0,648	0,648	-1,06E-04	0,1577	1,8650	74,20	0	r
668.	176,28	6,4988	0,589	0,589	-9,66E-05	0,1608	1,8662	74,25	0	r
669.	176,51	6,5017	0,533	0,533	-8,81E-05	0,1637	1,8671	74,29	0	r
670.	176,75	6,5053	0,473	0,473	-7,90E-05	0,1673	1,8732	74,53	0	r
671.	177,00	6,5083	0,408	0,408	-6,90E-05	0,1703	1,8708	74,44	0	r
672.	177,23	6,5112	0,351	0,351	-6,03E-05	0,1732	1,8711	74,45	0	r
673.	177,46	6,5144	0,293	0,293	-5,14E-05	0,1764	1,8742	74,57	0	r
674.	177,69	6,5172	0,237	0,237	-4,27E-05	0,1792	1,8737	74,55	0	r
675.	177,92	6,5202	0,179	0,179	-3,39E-05	0,1822	1,8747	74,59	0	r
676.	178,15	6,5230	0,123	0,123	-2,53E-05	0,1850	1,8747	74,59	0	r
677.	178,38	6,5262	0,065	0,065	-1,65E-05	0,1882	1,8779	74,72	0	r
678.	178,61	6,5291	0,008	0,008	-7,68E-06	0,1911	1,8780	74,72	0	r
679.	178,84	6,5323	-0,051	-0,051	1,36E-06	0,1943	1,8804	74,82	0	cb
680.	179,08	6,5353	-0,109	-0,109	1,02E-05	0,1973	1,8814	74,86	0	cb
681.	179,31	6,5384	-0,169	-0,169	1,93E-05	0,2004	1,8826	74,91	0	cb
682.	179,54	6,5413	-0,225	-0,225	2,79E-05	0,2033	1,8835	74,94	0	cb
683.	179,77	6,5445	-0,282	-0,282	3,67E-05	0,2065	1,8866	75,07	0	cb
684.	180,00	6,5475	-0,341	-0,341	4,58E-05	0,2095	1,8870	75,08	0	cb
685.	180,23	6,5508	-0,397	-0,397	5,42E-05	0,2128	1,8921	75,28	0	cb
686.	180,46	6,5537	-0,455	-0,455	6,32E-05	0,2157	1,8919	75,28	0	cb
687.	180,69	6,5570	-0,514	-0,514	7,22E-05	0,2190	1,8953	75,41	0	cb
688.	180,96	6,5603	-0,579	-0,579	8,21E-05	0,2223	1,8958	75,43	0	cb
689.	181,19	6,5636	-0,637	-0,637	9,10E-05	0,2256	1,8995	75,58	0	cb
690.	181,42	6,5666	-0,696	-0,696	1,00E-04	0,2286	1,8997	75,59	0	cb
691.	181,65	6,5698	-0,752	-0,752	1,09E-04	0,2318	1,9038	75,75	0	cb
692.	181,88	6,5727	-0,809	-0,809	1,17E-04	0,2347	1,9039	75,76	0	cb
693.	182,11	6,5759	-0,867	-0,867	1,26E-04	0,2379	1,9068	75,87	0	cb
694.	182,36	6,5795	-0,929	-0,929	1,36E-04	0,2415	1,9119	76,07	0	cb
695.	182,59	6,5824	-0,989	-0,989	1,45E-04	0,2444	1,9108	76,03	0	cb
696.	182,82	6,5855	-1,046	-1,046	1,54E-04	0,2475	1,9133	76,13	0	cb
697.	183,05	6,5885	-1,104	-1,104	1,63E-04	0,2505	1,9142	76,16	0	cb
698.	183,28	6,5918	-1,161	-1,161	1,71E-04	0,2538	1,9183	76,33	0	cb
699.	183,51	6,5947	-1,217	-1,217	1,80E-04	0,2567	1,9194	76,37	0	cb
700.	183,74	6,5979	-1,276	-1,276	1,89E-04	0,2599	1,9217	76,46	0	cb
701.	183,97	6,6011	-1,332	-1,332	1,98E-04	0,2631	1,9255	76,61	0	cb
702.	184,21	6,6040	-1,392	-1,392	2,07E-04	0,2660	1,9247	76,58	0	cb
703.	184,44	6,6072	-1,449	-1,449	2,15E-04	0,2692	1,9276	76,70	0	cb
704.	184,67	6,6104	-1,508	-1,508	2,25E-04	0,2724	1,9300	76,79	0	cb
705.	184,90	6,6133	-1,566	-1,566	2,33E-04	0,2753	1,9302	76,80	0	cb
706.	185,13	6,6165	-1,622	-1,622	2,42E-04	0,2785	1,9339	76,95	0	cb
707.	185,36	6,6193	-1,679	-1,679	2,51E-04	0,2813	1,9332	76,92	0	cb
708.	185,59	6,6224	-1,737	-1,737	2,60E-04	0,2844	1,9351	76,99	0	cb
709.	185,82	6,6253	-1,794	-1,794	2,68E-04	0,2873	1,9356	77,01	0	cb

710.	186,05	6,6285	-1,854	-1,854	2,77E-04	0,2905	1,9378	77,10	0	cb
711.	186,29	6,6316	-1,911	-1,911	2,86E-04	0,2936	1,9397	77,18	0	cb
712.	186,52	6,6345	-1,971	-1,971	2,95E-04	0,2965	1,9391	77,15	0	cb
713.	186,76	6,6378	-2,028	-2,028	3,04E-04	0,2998	1,9432	77,32	0	cb
714.	186,98	6,6409	-2,084	-2,084	3,13E-04	0,3029	1,9461	77,43	0	cb
715.	187,21	6,6442	-2,142	-2,142	3,22E-04	0,3062	1,9500	77,59	0	cb
716.	187,44	6,6472	-2,201	-2,201	3,31E-04	0,3092	1,9505	77,61	0	cb
717.	187,67	6,6503	-2,256	-2,256	3,39E-04	0,3123	1,9536	77,73	0	cb
718.	187,90	6,6532	-2,316	-2,316	3,48E-04	0,3152	1,9529	77,70	0	cb
719.	188,13	6,6569	-2,373	-2,373	3,57E-04	0,3189	1,9609	78,02	0	cb
720.	188,39	6,6603	-2,438	-2,438	3,67E-04	0,3223	1,9625	78,08	0	cb
721.	188,62	6,6636	-2,495	-2,495	3,76E-04	0,3256	1,9664	78,24	0	cb
722.	188,85	6,6668	-2,551	-2,551	3,84E-04	0,3288	1,9703	78,40	0	cb
723.	189,10	6,6696	-2,614	-2,614	3,94E-04	0,3316	1,9670	78,26	0	cb
724.	189,33	6,6721	-2,671	-2,671	4,03E-04	0,3341	1,9634	78,12	0	cb
725.	189,56	6,6744	-2,729	-2,729	4,11E-04	0,3364	1,9575	77,89	0	cb
726.	189,79	6,6762	-2,788	-2,788	4,21E-04	0,3382	1,9461	77,43	0	cb
727.	190,02	6,6778	-2,845	-2,845	4,29E-04	0,3398	1,9338	76,94	0	cb
728.	190,26	6,6790	-2,903	-2,903	4,38E-04	0,3410	1,9170	76,28	0	cb
729.	190,48	6,6799	-2,959	-2,959	4,47E-04	0,3419	1,8986	75,54	0	cb
730.	190,71	6,6803	-3,017	-3,017	4,56E-04	0,3423	1,8736	74,55	0	cb
731.	190,93	6,6803	-3,071	-3,071	4,64E-04	0,3423	1,8470	73,49	0	cb
732.	191,16	6,6797	-3,129	-3,129	4,73E-04	0,3417	1,8129	72,13	8,83	cb
733.	191,40	6,6787	-3,188	-3,188	4,82E-04	0,3407	1,7739	70,58	14,79	cb
734.	191,63	6,6771	-3,246	-3,246	4,91E-04	0,3391	1,7299	68,83	19,46	cb
735.	191,86	6,6750	-3,303	-3,303	4,99E-04	0,3370	1,6811	66,89	23,61	cb
736.	192,07	6,6715	-3,357	-3,357	5,08E-04	0,3335	1,6204	64,47	27,97	cb
737.	192,34	6,6677	-3,425	-3,425	5,18E-04	0,3297	1,5497	61,66	32,36	cb
738.	192,57	6,6624	-3,484	-3,484	5,27E-04	0,3244	1,4687	58,44	36,82	cb
739.	192,80	6,6563	-3,538	-3,538	5,35E-04	0,3183	1,3822	54,99	41,12	cb
740.	193,03	6,6468	-3,597	-3,597	5,44E-04	0,3088	1,2599	50,13	46,63	cb
741.	193,30	6,6337	-3,662	-3,662	5,54E-04	0,2957	1,0997	43,75	53,17	cb
742.	193,54	6,3831	-3,720	-3,720	5,63E-04	0,0451	-1,3868	-	139,10	cb

Temperaturangaben beziehen sich auf die Skala der ITS-90. **Standardabweichungen:** Verschiedentlich werden Regressionsfunktionen mit Standardabweichungen bzw. Varianzen qualifiziert. Diese Angaben werden berechnet aus der Summe der Quadrate der Abweichungen der Einzelwerte zu jeweils berechneten Funktionswerten dividiert durch die Anzahl der Werte weniger 1. Sofern nicht anders bezeichnet, werden für \pm (Standardmess-)Unsicherheiten einfache Standardabweichungen - ohne Erweiterungsfaktoren - angegeben, d.h. die Überdeckung betrifft 67% der Werte.

Programm

Data created during execution of the IMPro "ContactAngle_atConstantLevel", type 4/4. Automatic self-repetition of the IMPro - the 5. Repetition. IMPro finished as projected.

(the digital twin of process IDN°24605 provides on demand reports with more details, audit-log protocol and structured raw data)

Prüfmittel

Die Kraftmesseinrichtung (WZA224) wurde am Vortag dieser Messung von *Labor* justiert.

IMETER ID23903733: Technische Daten: Auflösung des Wägesystems 0,1 mg, Messunsicherheit (Linearität) 0,2 mg, Dichte der Justiermasse ρ_{cal} 8,00 g/cm³, Luftdichte ρ_{air} 1,15136 kg/m³; Schwerebeschleunigung g 9,80769 m/s². Pt100-Temperaturmessung: Auflösung 0,001 K, Messunsicherheit $\pm 0,005$ K, R° 100.0056 Ω , Kalibrierintervall 30 min (BN°2, -25/152°C, 3S, FS15,8). Die Messauflösung der sekundären Temperaturmessung beträgt 0,01 K, die Unsicherheit 0,03 K. Akquisitions-Softwareversion IMETER 7.5.24, LizenzN° *3037-4759*, W. 6.2,9200- Betriebssystem auf PC Ser.N° 6995684 (C, SSD).