

ID N° 23292 - Contact Angle Measurement - M4st

Executed on Sep 04, 2023, by M. Breitwieser

Cu-Stab

Nach 23292 Tara +1.7 mg *** Screening-Sequenz. Start /Ende mit statischer Messung *** 17:36:28 #Charaterisierung Sequenz A.

Probe mit Wasser, Tensid und viel Wasser gereinigt, abgetrocknet und mit der Messflüssigkeit auf Zellstoff abgerieben.

• Kupfer / Isooktan 99.5+% : (20,1°C, 9,9', 20mm, 0,0490mm/s - static; θ -superwetting)

$\theta_{C,s} = 0_{\pm 0}$ ° CAH 0°, ${}^a\bar{E}_s = 20,43_{\pm 0,14}$ mN/m ${}^aH_s = -0,394$ mN/m, $\bar{B}_{\%,s} = 109,0\%$

Report

2. ===== Collection of Measurements in this Series Kupfer / Isooktan 99.5+% =====

Tabelle 1.2: Conditions and Results

N°	IDN° ...erData39	θ [°C]	$\Delta\tau$ [min]	\bar{v}_z [mm/s]	\bar{C}_a [1]	t_{eq} [s]	θ_M [°]	CAH [°]	aH [mN/m]	${}^a\bar{E}$ [mN/m]	$\pm\sigma$ [mN/m]	\bar{S} [m]/m ²	$\bar{B}_{\%,Isookta...}$ [%]
1.	23292 ₀	20,062	**0**	»0,0443«	-	3,11	<0>	<0>	-0,394	20,43	±0,14	1,69	109,0%
2.	23293 ₁	20,014	+23,8	10,0	2,65E-4	6,1	<0>	<0>	27,8	244,4	±6,1	226	1303,6%
3.	23294 ₂	20,022	+26,3	5,00	1,32E-4	6,5	18	31	-7,8	19,6	±3,8	0,860	104,5%
4.	23295 ₃	20,076	+29,9	2,50	6,61E-5	5,9	<37>	<-73>	32,21	21,6	±1,1	2,86	115,2%
5.	23296 ₄	20,101	+31,2	1,25	3,30E-5	5,6	<25>	<-49>	17,93	21,34	±0,76	2,60	113,8%
6.	23297 ₅	20,099	+32,7	0,625	1,65E-5	5,7	<0>	<0>	10,89	28,01	±0,23	9,27	149,4%
7.	23298 ₆	20,071	+34,9	0,313	8,27E-6	6,3	<11>	<-22>	6,670	20,713	±0,058	1,97	110,5%
8.	23299 ₇	20,046	+38,3	0,156	4,13E-6	6,7	<0>	<0>	3,761	20,890	±0,052	2,15	111,5%
9.	23300 ₈	20,036	+43,9	<0,957>	2,53E-5	5,3	<20>	<-39>	14,55	21,80	±0,51	3,06	116,2%
10.	23301 ₉	20,017	+45,5	<0,662>	1,75E-5	6,0	<26>	<-51>	16,03	19,85	±0,53	1,11	105,8%
11.	23302 ₁₀	20,01	+47,7	<0,285>	7,53E-6	6,4	<19>	<-37>	8,52	19,24	±0,28	0,500	102,6%
12.	23303 ₁₁	20,001	+51,6	<0,431>*	1,15E-5	6,1	<20>	<-39>	9,41	19,21	±0,47	0,470	102,4%
13.	23304 ₁₂	20,003	+54,2	<0,376>*	9,92E-6	6,8	<20>	<-40>	7,76	18,17	±0,58	-0,570	96,9%
14.	23305 ₁₃	20,005	+57,7	<0,392>*	1,04E-5	6,5	<21>	<-42>	7,80	17,73	±0,57	-1,01	94,6%
15.	23306 ₁₄	20,005	+61,7	<1,50>*	3,97E-5	6,0	26	-40	14,1	19,2	±6,7	0,460	102,1%
16.	23307 ₁₅	20	+63,0	<1,72>*	4,54E-5	6,7	25	-14	8,1	18,2	±6,9	-0,540	96,8%
17.	23308 ₁₆	20	+64,4	<2,28>*	6,04E-5	6,4	35	8,0	0,8	14,6	±6,8	-4,14	77,9%
18.	23309 ₁₇	20	+65,6	<3,96>*	1,05E-4	5,8	35	66	-12,57	13,1	±2,4	-5,64	69,8%
19.	23310 ₁₈	19,997	+66,7	<12,0>*	3,17E-4	5,5	<90>	<180>	-168,7	61,0	±4,8	42,3	325,1%
20.	23311 ₁₉	20	+67,7	»0,0445«	-	3,14	27	-2,7	0,397	16,754	±0,043	-1,99	89,4%
21.	23312 ₂₀	20	+88,6	»0,0441«	-	3,14	27	-0,8	0,127	16,766	±0,042	-1,97	89,4%
22.	23313 ₂₁	20	+107	»0,0440«	-	3,17	22,5	-0,700	0,086	17,311	±0,046	-1,43	92,3%

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 $\bar{B}_{\%,Isookta...}$ 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 $W_0 = 24,6763$ 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.	24,6763	0,0	24,6858	9,5	13,7	14
2.	24,6839	7,6	24,6864	10,1	14,6	0,87
3.	24,6789	2,6	24,6852	8,9	12,9	-1,7
4.	24,6849	8,6	24,6835	7,2	10,4	-2,5
5.	24,6833	7,0	24,6825	6,2	9,0	-1,4
6.	24,6826	6,3	24,6821	5,8	8,4	-0,58
7.	24,6820	5,7	24,6818	5,5	7,9	-0,43
8.	24,6819	5,6	24,6819	5,6	8,1	0,14
9.	24,7316	55,3	24,6833	7,0	10,1	2,0
10.	24,6831	6,8	24,6826	6,3	9,1	-1,0
11.	24,6826	6,3	24,6823	6,0	8,7	-0,43
12.	24,6823	6,0	24,6834	7,1	10,3	1,6
13.	24,6833	7,0	24,6833	7,0	10,1	-0,14
14.	24,7229	46,6	24,6819	5,6	8,1	-2,0
15.	24,6818	5,5	24,6839	7,6	11,0	2,9
16.	24,6838	7,5	24,6843	8,0	11,6	0,58
17.	24,6841	7,8	24,6850	8,7	12,6	1,0
18.	24,6847	8,4	24,6870	10,7	15,5	2,9
19.	24,6868	10,5	24,6937	17,4	25,1	9,7
20.	24,6930	16,7	24,6837	7,4	10,7	-1,4
21.	24,6837	7,4	24,6843	8,0	11,6	0,87
22.	24,6839	7,6	24,6854	9,1	13,2	1,6

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°23292: Static Contact Angle =====

Kupfer, cylindric $\varnothing 7,971$ mm

Contact Angle, CA θ_c	<0 \pm0$^\circ$>	- superwetting -	
Contact Angle Hysteresis, CAH_s	<0$^\circ$>		
	Advancing $\theta_{A,s}$	Receding $\theta_{R,s}$	Transition - mm
Contact Angles, θ_s	0$^\circ$	0$^\circ$	0$^\circ_{adv.} \Rightarrow$ 0$^\circ_{rec.}$
Rated measurements $n_{\text{mm-range}}$	101 0,000 - 20,001mm	113 20,001 - 0,000mm	2 20,001 - 19,951mm
avg. Triple line speed \bar{v}_z [mm/s]	0,0490 \pm 0,0408	-0,0395 \pm 1,26	
avg. Step distance $\bar{\Delta}h_0$ [mm]	0,200 \pm 9,95E-05	-0,178 \pm 0,0536	
avg. equilibration Time \bar{t}_{eq} [s]	3,09 \pm0,240	3,13 \pm0,253	

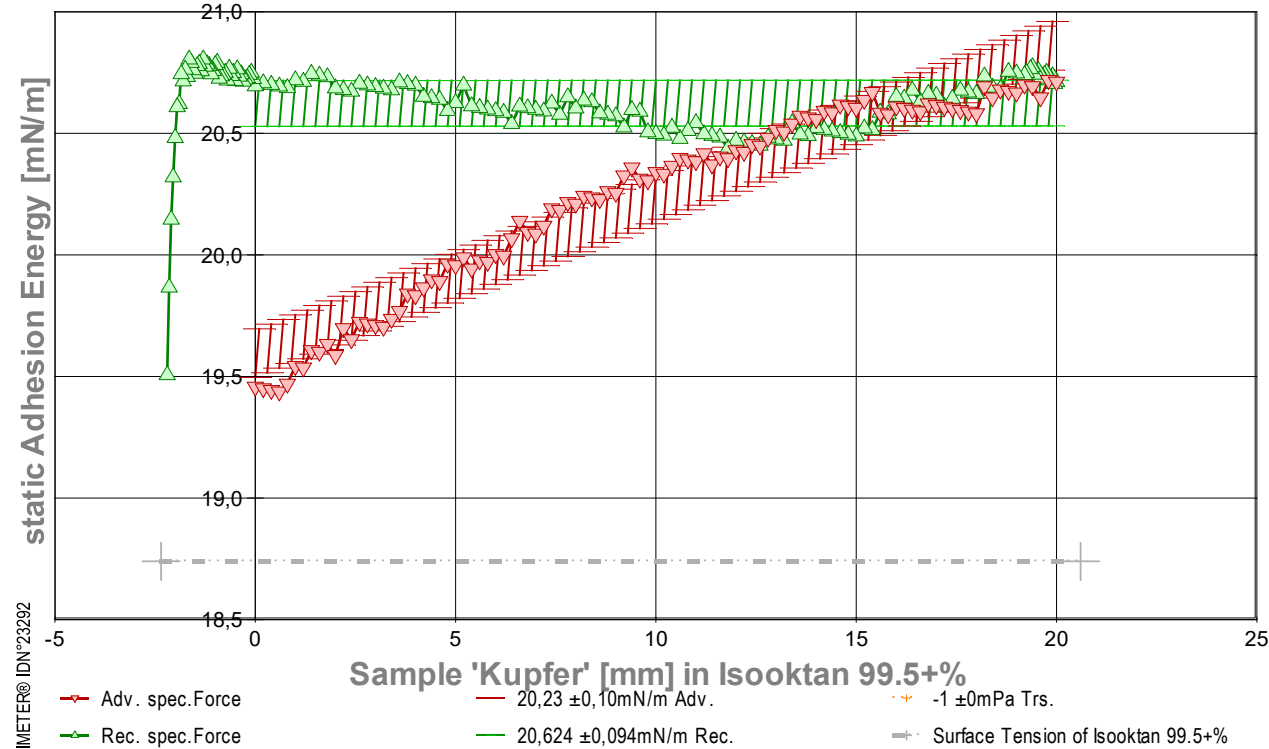
Static Contact Angle Measurement: For superwetting - consider adhesion parameters for analysis. The avg. equilibration Time t_{eq} is the mean of the time between positioning and acquiring the wetting force. The criterion of force equilibrium is defined in the utilized IMPro.

Adhesion Force of the equilibrated Triple Line

Energy of Adhesion, ${}^a\bar{E}_s = ({}^aE_A + {}^aE_R) / 2$	20,43 \pm0,14 mN/m		
Hysteresis, ${}^aH_s = {}^aE_A - {}^aE_R$	-0,394 mN/m		
Parameter of spreading, $\bar{S}_s = {}^a\bar{E} - \gamma$	1,69 mJ/m ²		
relative wettability, $\bar{B}_{\%s} = 100 \cdot {}^a\bar{E} / \gamma$	109,0% with Isooktan 99.5+%		
	Advancing ${}^aE_{A,s}$	Receding ${}^aE_{R,s}$	Transition - mm
Energy of Adhesion, aE_s [mN/m]	20,23	20,624	20,70 $_{<adv.>} \Rightarrow$ 20,73 $_{rec.}$
Standard deviation ${}^a\sigma$ [mN/m]	\pm 0,10	\pm 0,094	\pm 0
Linear regression, slope [mPa]	0,06	0,000	-1
correlation coefficient r^2	0,937	0,00004	1,0
Relative wettability, $B_{\%s}$	108,0%	110,1%	

Data has left the region of measurable Contact Angles. resolving a kind of superwetting: ${}^aE_{A,R} > \gamma \cdot \cos\theta$ and wettability $B > 100\%$

- Diagramm 1.3: 'Triple-line Force²' static forces at the triple line, $\bar{v}_z=0,044$ mm/s



- Das Diagramm zeigt den Verlauf der Adhäsionsenergie aE entlang der Probenoberfläche. Den Messwerte werden bei unbewegtem Pegel des Fluids am Probekörper als statische Gleichgewichtszustände bestimmt. 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 Isooktan 99.5+% ist als grau gestrichelte Horizontale bei 18,74 mN/m eingezeichnet; sie gibt die *maximale Zugfestigkeit* an, die eine flüssige Isooktan 99.5+%-Oberfläche aushalten kann. Aber, die Adhäsionsenergie zwischen Isooktan 99.5+% und Kupfer übersteigt die Oberflächenspannung. Diese *Überbenetzung* (Superwetting) ist gekennzeichnet durch die *Kontaktwinkelproblematik*, weil formal $\cos(\theta) > 1$ auftritt. Insofern andere Störeinflüsse (ggf. elektrostatische, rheologische) auszuschließen sind, kommen Grenzschicht- und/oder tribologische Effekte in den Blick, die den lokalen Wert der Oberflächenspannung raumgreifend - oder den Wert einer ungeklärten Zusatzkraft an der *Triple Line* - erhöhen und das Geschehen beeinflussen könnten.

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

Sample: 'Kupfer', **Form:** cylindric, diameter 7,971 mm.

Test Liquid: 'Isooktan 99.5+%' at 20,062°C: density 0,69186 g/mL, surface tension 18,74 mN/m, viscosity 0,4956 mPa·s; Capillary length 1,66 mm.

Suspension/Fixation: by operator.

Vessel: tempered double wall measuring cell, height 140 mm, inclosing sample and liquid at coherent temperature and atmosphere; Surface area ∞ by CLT. - The 'CLT' Constant-Level-Technic prevents rising/falling of the Isooktan 99.5+%-level in the vessel (surface 1452mm²) through immersion/emersion of the sample volume in the vessel by appropriate pumping of Isooktan 99.5+%.

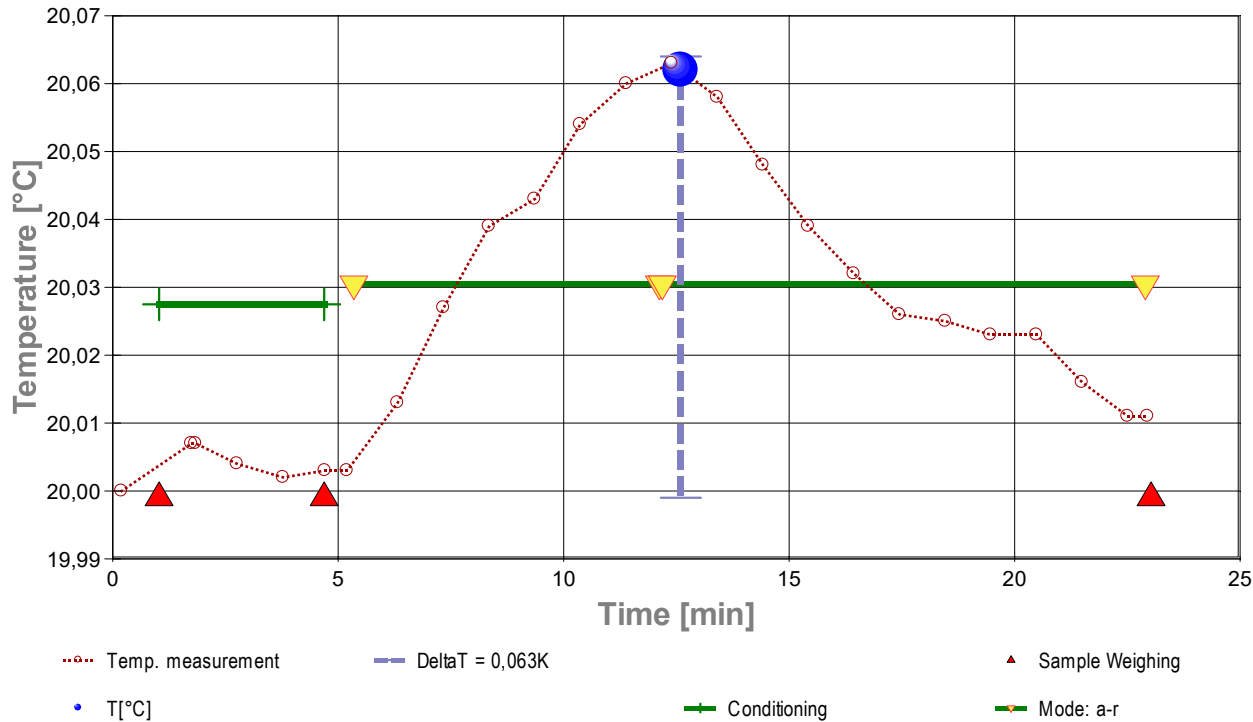
Conditioning: during 2,9 min in the measuring cell above the surface of the liquid.

Sample Weight: at start 24,6762 g, after conditioning 24,6763 g, after the measurement 24,6858 g.
Gain in weight during conditioning 0,0001 g (+4,0 ppm) and after measurement 0,0096 g (+0,39‰).

Measurement algorithm: static CA-measurement, acquisition of equilibrated values, stepwise movement. Maximum immersion of 20,001 mm and force equilibration at the inflection point for 3,8 s. Duration for immersion 6,8 min, for emersion 3,1 min.

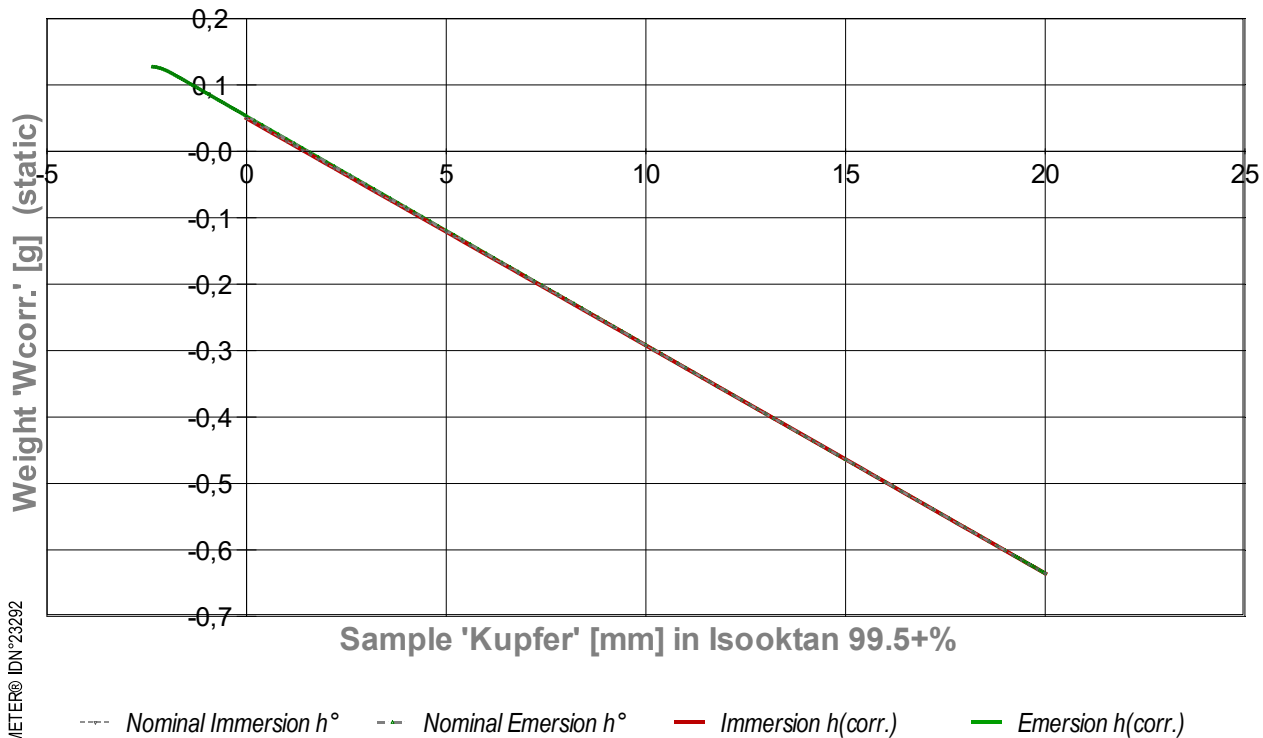
Time & Temperature: 20 Minuten; Temperaturänderung im Bereich von 20,00 bis 20,06°C. → Diagramm 2.4: 'Temperature & Events^{2'} --

Survey on Temperature and Time



- Das Diagramm "Temperature & Events^{2'}" dokumentiert neben der Flüssigkeitstemperatur der Messfluids (Isooktan 99.5+%) die zeitliche Abfolge der Verfahrensschritte. Die Temperaturmesswerte sind als kleine Kreise abgebildet; die kugelförmige Marke gibt die der Messung insgesamt zugeordnete Temperatur an (20,062°C). Markierungen auf der horizontalen grünen Linie bilden das Zeitintervall der Konditionierung ab, das auf das Einsetzen der Probe folgt. 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 Kupfer (ohne Kontakt zur Fluidoberfläche).

→ Diagramm 3.4: 'RawData^{2'} -- Acquired weights during immersion and emersion (raw data and immersion corrected lengths)



- Im Diagramm "RawData^{2'}" werden die Wägewerte zur statischen Kontaktwinkelmessung gegen die Eintauchtiefe der Probe abgebildet. Von den Roh-Wägewerten W_{RAW} wurden Proben- und Aufhängungsgewichte subtrahiert, so dass hier die *Gewichte* der Benetzung- 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 ($n=258$). - Within a row the column t lists the time of the CA-measurement. $t_{eq.}$ is the duration reach the equilibrated force after positioning (static measurement). 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*. With W_{RAW} the final total weight of the sample, sample holder, wetting force and buoyancy is printed. The $W_{corr.}$ -values* are former weighing values when the weight of the sample and its holder 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.

(Resolving static force of wetting from ${}^aF = (W_{RAW} - W_0 - W_{Buoy.}) \cdot g + F_{Buoy.air}$) * $W_{corr.} = W_{RAW} - W_0$ (with $W_0 = 24,6763$ g).

Table 3.5: Data table

N°	t [min]	$t_{eq.}$ [sec]	h_0 [mm]	$h_{corr.}$ [mm]	W_{RAW} [g]	$W_{corr.}$ [g]	aF [mN]	${}^aE_{A,R}$ [mN/m]	θ [°deg]	chr
1.	0,00	3,0	0,000	0,000	24,7260	0,0497	0,4872	19,46	0	a
2.	0,07	3,2	0,200	0,200	24,7191	0,0428	0,4871	19,45	0	a
3.	0,14	3,0	0,400	0,400	24,7122	0,0359	0,4869	19,44	0	a
4.	0,20	3,1	0,600	0,600	24,7053	0,0290	0,4867	19,44	0	a
5.	0,27	3,1	0,800	0,800	24,6985	0,0222	0,4876	19,47	0	a
6.	0,34	3,0	1,000	1,000	24,6918	0,0155	0,4894	19,54	0	a
7.	0,40	3,0	1,200	1,200	24,6849	0,0086	0,4892	19,54	0	a
8.	0,47	3,5	1,400	1,400	24,6782	0,0019	0,4910	19,61	0	a
9.	0,54	3,4	1,600	1,600	24,6713	-0,0050	0,4908	19,60	0	a
10.	0,62	3,0	1,800	1,800	24,6645	-0,0118	0,4917	19,63	0	a
11.	0,68	3,0	2,000	2,000	24,6575	-0,0188	0,4905	19,59	0	a
12.	0,75	2,9	2,200	2,200	24,6509	-0,0254	0,4933	19,70	0	a
13.	0,81	3,0	2,400	2,400	24,6439	-0,0324	0,4921	19,65	0	a
14.	0,88	3,0	2,600	2,600	24,6372	-0,0391	0,4939	19,72	0	a
15.	0,95	3,0	2,800	2,800	24,6303	-0,0460	0,4938	19,72	0	a
16.	1,02	3,0	3,000	3,000	24,6234	-0,0529	0,4936	19,71	0	a
17.	1,08	3,0	3,200	3,200	24,6165	-0,0598	0,4934	19,70	0	a
18.	1,15	3,1	3,400	3,400	24,6097	-0,0666	0,4942	19,74	0	a
19.	1,22	3,9	3,600	3,600	24,6029	-0,0734	0,4950	19,77	0	a
20.	1,30	3,0	3,800	3,800	24,5962	-0,0801	0,4968	19,84	0	a
21.	1,37	2,9	4,000	4,000	24,5893	-0,0870	0,4967	19,83	0	a
22.	1,43	3,0	4,200	4,200	24,5825	-0,0938	0,4975	19,87	0	a
23.	1,50	3,1	4,400	4,400	24,5757	-0,1006	0,4983	19,90	0	a
24.	1,56	3,1	4,600	4,600	24,5688	-0,1075	0,4981	19,89	0	a
25.	1,63	3,0	4,800	4,800	24,5621	-0,1142	0,4999	19,96	0	a
26.	1,70	3,0	5,000	5,000	24,5552	-0,1211	0,4998	19,96	0	a
27.	1,76	2,9	5,200	5,200	24,5484	-0,1279	0,5006	19,99	0	a
28.	1,83	2,9	5,400	5,400	24,5414	-0,1349	0,4994	19,94	0	a
29.	1,90	3,0	5,600	5,600	24,5346	-0,1417	0,5003	19,98	0	a
30.	1,96	3,1	5,800	5,800	24,5277	-0,1486	0,5001	19,97	0	a
31.	2,03	3,2	6,000	6,000	24,5209	-0,1554	0,5009	20,00	0	a
32.	2,10	2,9	6,200	6,200	24,5140	-0,1623	0,5007	20,00	0	a
33.	2,17	3,0	6,400	6,400	24,5073	-0,1690	0,5025	20,07	0	a
34.	2,23	3,0	6,600	6,600	24,5006	-0,1757	0,5043	20,14	0	a
35.	2,30	3,0	6,800	6,800	24,4936	-0,1827	0,5032	20,09	0	a
36.	2,37	3,0	7,000	7,000	24,4867	-0,1896	0,5030	20,09	0	a
37.	2,43	3,1	7,200	7,200	24,4799	-0,1964	0,5038	20,12	0	a
38.	2,50	3,1	7,400	7,400	24,4732	-0,2031	0,5056	20,19	0	a
39.	2,57	3,0	7,600	7,600	24,4663	-0,2100	0,5054	20,18	0	a
40.	2,64	3,1	7,800	7,800	24,4595	-0,2168	0,5063	20,22	0	a
41.	2,70	3,0	8,000	8,000	24,4526	-0,2237	0,5061	20,21	0	a
42.	2,77	3,0	8,200	8,200	24,4458	-0,2305	0,5069	20,24	0	a
43.	2,83	3,0	8,400	8,400	24,4389	-0,2374	0,5067	20,24	0	a
44.	2,90	3,0	8,600	8,600	24,4320	-0,2443	0,5066	20,23	0	a
45.	2,96	3,1	8,800	8,800	24,4252	-0,2511	0,5074	20,26	0	a
46.	3,03	3,5	9,000	9,000	24,4183	-0,2580	0,5072	20,25	0	a
47.	3,11	3,0	9,200	9,200	24,4116	-0,2647	0,5090	20,33	0	a
48.	3,17	3,0	9,400	9,400	24,4048	-0,2715	0,5098	20,36	0	a
49.	3,24	3,0	9,600	9,600	24,3978	-0,2785	0,5087	20,31	0	a
50.	3,30	3,1	9,800	9,800	24,3909	-0,2854	0,5085	20,31	0	a
51.	3,37	3,0	10,000	10,000	24,3841	-0,2922	0,5093	20,34	0	a
52.	3,44	3,5	10,200	10,200	24,3772	-0,2991	0,5092	20,33	0	a
53.	3,51	3,1	10,400	10,400	24,3704	-0,3059	0,5100	20,37	0	a
54.	3,58	2,9	10,600	10,600	24,3636	-0,3127	0,5108	20,40	0	a
55.	3,64	3,0	10,800	10,800	24,3567	-0,3196	0,5106	20,39	0	a
56.	3,71	3,1	11,000	11,000	24,3498	-0,3265	0,5105	20,38	0	a
57.	3,78	3,1	11,200	11,200	24,3430	-0,3333	0,5113	20,42	0	a
58.	3,84	3,6	11,400	11,400	24,3360	-0,3403	0,5101	20,37	0	a
59.	3,92	3,0	11,600	11,600	24,3292	-0,3471	0,5109	20,40	0	a
60.	3,99	3,0	11,800	11,800	24,3223	-0,3540	0,5108	20,40	0	a
61.	4,05	3,5	12,000	12,000	24,3155	-0,3608	0,5116	20,43	0	a
62.	4,13	3,0	12,200	12,200	24,3086	-0,3677	0,5114	20,42	0	a
63.	4,19	3,1	12,400	12,400	24,3018	-0,3745	0,5122	20,46	0	a
64.	4,26	4,5	12,600	12,600	24,2949	-0,3814	0,5121	20,45	0	a
65.	4,35	3,1	12,800	12,800	24,2881	-0,3882	0,5129	20,48	0	a
66.	4,42	3,9	13,000	13,000	24,2813	-0,3950	0,5137	20,51	0	a
67.	4,50	3,1	13,200	13,200	24,2744	-0,4019	0,5135	20,51	0	a
68.	4,57	3,1	13,400	13,400	24,2676	-0,4087	0,5143	20,54	0	a
69.	4,64	3,0	13,600	13,600	24,2608	-0,4155	0,5151	20,57	0	a
70.	4,70	3,0	13,800	13,800	24,2539	-0,4224	0,5150	20,56	0	a
71.	4,77	3,0	14,000	14,000	24,2470	-0,4293	0,5148	20,56	0	a
72.	4,83	3,0	14,200	14,200	24,2402	-0,4361	0,5157	20,59	0	a
73.	4,90	3,6	14,400	14,400	24,2333	-0,4430	0,5155	20,59	0	a
74.	4,98	3,0	14,600	14,600	24,2265	-0,4498	0,5163	20,62	0	a
75.	5,05	3,6	14,800	14,800	24,2196	-0,4567	0,5161	20,61	0	a
76.	5,12	2,9	15,000	15,000	24,2127	-0,4636	0,5160	20,60	0	a
77.	5,19	3,0	15,200	15,200	24,2059	-0,4704	0,5168	20,64	0	a
78.	5,25	3,0	15,400	15,400	24,1991	-0,4772	0,5176	20,67	0	a
79.	5,32	3,0	15,600	15,600	24,1920	-0,4843	0,5155	20,58	0	a
80.	5,39	3,0	15,800	15,800	24,1851	-0,4912	0,5153	20,58	0	a
81.	5,45	3,0	16,000	16,000	24,1783	-0,4980	0,5161	20,61	0	a
82.	5,52	3,0	16,200	16,200	24,1714	-0,5049	0,5159	20,60	0	a
83.	5,59	3,0	16,400	16,400	24,1645	-0,5118	0,5158	20,60	0	a
84.	5,65	3,0	16,600	16,600	24,1576	-0,5187	0,5156	20,59	0	a

85.	5,72	3,0	16,800	16,800	24,1508	-0,5255	0,5164	20,62	0	a
86.	5,78	3,0	17,000	17,000	24,1439	-0,5324	0,5162	20,62	0	a
87.	5,85	3,0	17,200	17,200	24,1370	-0,5393	0,5161	20,61	0	a
88.	5,91	3,0	17,400	17,400	24,1301	-0,5462	0,5159	20,60	0	a
89.	5,98	3,0	17,600	17,600	24,1232	-0,5531	0,5157	20,60	0	a
90.	6,04	3,6	17,800	17,800	24,1163	-0,5600	0,5156	20,59	0	a
91.	6,12	3,0	18,000	18,000	24,1094	-0,5669	0,5154	20,58	0	a
92.	6,18	3,0	18,200	18,200	24,1028	-0,5735	0,5182	20,69	0	a
93.	6,25	3,0	18,400	18,400	24,0958	-0,5805	0,5170	20,65	0	a
94.	6,32	3,0	18,600	18,600	24,0890	-0,5873	0,5178	20,68	0	a
95.	6,38	3,0	18,801	18,801	24,0821	-0,5942	0,5177	20,67	0	a
96.	6,45	3,0	19,001	19,001	24,0752	-0,6011	0,5175	20,67	0	a
97.	6,51	3,0	19,201	19,201	24,0684	-0,6079	0,5184	20,70	0	a
98.	6,58	3,1	19,401	19,401	24,0615	-0,6148	0,5182	20,69	0	a
99.	6,65	3,0	19,601	19,601	24,0545	-0,6218	0,5170	20,65	0	a
100.	6,71	3,0	19,801	19,801	24,0478	-0,6285	0,5188	20,72	0	a
101.	6,78	3,0	20,001	20,001	24,0409	-0,6354	0,5187	20,71	0	a
102.	6,84	3,1	19,951	19,951	24,0426	-0,6337	0,5185	20,70	0	r
103.	6,90	3,0	19,901	19,901	24,0444	-0,6319	0,5192	20,73	0	r
104.	6,96	3,0	19,851	19,851	24,0461	-0,6302	0,5190	20,73	0	r
105.	7,02	3,2	19,801	19,801	24,0478	-0,6285	0,5188	20,72	0	r
106.	7,09	3,1	19,751	19,751	24,0496	-0,6267	0,5196	20,75	0	r
107.	7,15	3,1	19,701	19,701	24,0513	-0,6250	0,5194	20,74	0	r
108.	7,21	3,1	19,651	19,651	24,0530	-0,6233	0,5192	20,73	0	r
109.	7,27	3,1	19,601	19,601	24,0547	-0,6216	0,5190	20,73	0	r
110.	7,34	3,0	19,551	19,551	24,0565	-0,6198	0,5198	20,76	0	r
111.	7,40	3,1	19,501	19,501	24,0582	-0,6181	0,5196	20,75	0	r
112.	7,46	3,3	19,451	19,451	24,0599	-0,6164	0,5194	20,74	0	r
113.	7,53	3,0	19,401	19,401	24,0617	-0,6146	0,5202	20,77	0	r
114.	7,59	3,1	19,351	19,351	24,0634	-0,6129	0,5200	20,76	0	r
115.	7,65	3,1	19,301	19,301	24,0650	-0,6113	0,5188	20,72	0	r
116.	7,71	3,0	19,251	19,251	24,0668	-0,6095	0,5196	20,75	0	r
117.	7,77	3,0	19,201	19,201	24,0685	-0,6078	0,5194	20,74	0	r
118.	7,84	2,7	19,001	19,001	24,0754	-0,6009	0,5195	20,75	0	r
119.	7,90	3,0	18,801	18,801	24,0823	-0,5940	0,5197	20,75	0	r
120.	7,97	4,0	18,601	18,601	24,0890	-0,5873	0,5179	20,68	0	r
121.	8,05	3,0	18,401	18,401	24,0959	-0,5804	0,5181	20,69	0	r
122.	8,14	4,0	18,201	18,201	24,1029	-0,5734	0,5192	20,73	0	r
123.	8,22	3,1	18,001	18,001	24,1096	-0,5667	0,5174	20,66	0	r
124.	8,28	3,0	17,801	17,801	24,1165	-0,5598	0,5176	20,67	0	r
125.	8,35	3,0	17,601	17,601	24,1234	-0,5529	0,5178	20,68	0	r
126.	8,42	3,0	17,401	17,401	24,1302	-0,5461	0,5169	20,64	0	r
127.	8,48	3,2	17,201	17,201	24,1370	-0,5393	0,5161	20,61	0	r
128.	8,55	3,4	17,001	17,001	24,1440	-0,5323	0,5173	20,66	0	r
129.	8,63	3,0	16,801	16,801	24,1509	-0,5254	0,5174	20,66	0	r
130.	8,69	3,5	16,601	16,601	24,1577	-0,5186	0,5166	20,63	0	r
131.	8,77	3,0	16,401	16,401	24,1647	-0,5116	0,5178	20,68	0	r
132.	8,84	3,0	16,201	16,201	24,1715	-0,5048	0,5170	20,64	0	r
133.	8,91	3,0	16,001	16,001	24,1784	-0,4979	0,5171	20,65	0	r
134.	8,97	3,1	15,801	15,801	24,1851	-0,4912	0,5153	20,58	0	r
135.	9,04	3,1	15,601	15,601	24,1920	-0,4843	0,5155	20,59	0	r
136.	9,11	3,5	15,401	15,401	24,1987	-0,4776	0,5137	20,51	0	r
137.	9,18	3,0	15,201	15,201	24,2056	-0,4707	0,5139	20,52	0	r
138.	9,25	3,0	15,001	15,001	24,2124	-0,4639	0,5131	20,49	0	r
139.	9,31	3,0	14,801	14,801	24,2193	-0,4570	0,5132	20,49	0	r
140.	9,38	3,0	14,601	14,601	24,2262	-0,4501	0,5134	20,50	0	r
141.	9,45	3,0	14,401	14,401	24,2331	-0,4432	0,5136	20,51	0	r
142.	9,51	3,1	14,201	14,201	24,2400	-0,4363	0,5137	20,52	0	r
143.	9,58	3,1	14,001	14,001	24,2469	-0,4294	0,5139	20,52	0	r
144.	9,65	3,5	13,801	13,801	24,2537	-0,4226	0,5131	20,49	0	r
145.	9,72	3,0	13,601	13,601	24,2606	-0,4157	0,5133	20,50	0	r
146.	9,79	3,0	13,401	13,401	24,2676	-0,4087	0,5144	20,54	0	r
147.	9,86	3,1	13,201	13,201	24,2743	-0,4020	0,5126	20,47	0	r
148.	9,92	4,0	13,000	13,000	24,2812	-0,3951	0,5127	20,48	0	r
149.	10,01	3,1	12,800	12,800	24,2881	-0,3882	0,5129	20,48	0	r
150.	10,07	3,0	12,600	12,600	24,2949	-0,3814	0,5121	20,45	0	r
151.	10,16	3,0	12,400	12,400	24,3018	-0,3745	0,5123	20,46	0	r
152.	10,22	3,5	12,200	12,200	24,3087	-0,3676	0,5124	20,46	0	r
153.	10,30	3,0	12,000	12,000	24,3156	-0,3607	0,5126	20,47	0	r
154.	10,36	3,5	11,800	11,800	24,3224	-0,3539	0,5118	20,44	0	r
155.	10,44	3,0	11,600	11,600	24,3294	-0,3469	0,5129	20,48	0	r
156.	10,50	3,5	11,400	11,400	24,3363	-0,3400	0,5131	20,49	0	r
157.	10,58	3,0	11,200	11,200	24,3432	-0,3331	0,5133	20,50	0	r
158.	10,64	3,1	11,000	11,000	24,3502	-0,3261	0,5144	20,54	0	r
159.	10,71	3,1	10,800	10,800	24,3570	-0,3193	0,5136	20,51	0	r
160.	10,78	3,0	10,600	10,600	24,3638	-0,3125	0,5128	20,48	0	r
161.	10,84	3,0	10,400	10,400	24,3708	-0,3055	0,5139	20,52	0	r
162.	10,91	3,0	10,200	10,200	24,3776	-0,2987	0,5131	20,49	0	r
163.	10,98	3,0	10,000	10,000	24,3845	-0,2918	0,5133	20,50	0	r
164.	11,04	3,0	9,800	9,800	24,3914	-0,2849	0,5135	20,50	0	r
165.	11,11	3,6	9,600	9,600	24,3985	-0,2778	0,5156	20,59	0	r
166.	11,19	3,0	9,400	9,400	24,4054	-0,2709	0,5158	20,60	0	r
167.	11,25	3,1	9,200	9,200	24,4121	-0,2642	0,5140	20,52	0	r
168.	11,32	3,0	9,000	9,000	24,4191	-0,2572	0,5151	20,57	0	r
169.	11,39	3,0	8,800	8,800	24,4260	-0,2503	0,5153	20,58	0	r
170.	11,45	3,0	8,600	8,600	24,4329	-0,2434	0,5154	20,58	0	r
171.	11,52	3,1	8,400	8,400	24,4399	-0,2364	0,5166	20,63	0	r
172.	11,59	3,5	8,200	8,200	24,4468	-0,2295	0,5167	20,64	0	r
173.	11,66	3,2	8,000	8,000	24,4536	-0,2227	0,5159	20,60	0	r
174.	11,73	3,1	7,800	7,800	24,4606	-0,2157	0,5171	20,65	0	r
175.	11,80	3,9	7,600	7,600	24,4673	-0,2090	0,5153	20,58	0	r
176.	11,88	3,0	7,400	7,400	24,4743	-0,2020	0,5164	20,62	0	r
177.	11,95	3,1	7,200	7,200	24,4811	-0,1952	0,5156	20,59	0	r
178.	12,02	3,0	7,000	7,000	24,4880	-0,1883	0,5158	20,60	0	r
179.	12,09	3,1	6,800	6,800	24,4949	-0,1814	0,5160	20,60	0	r
180.	12,17	3,1	6,600	6,600	24,5018	-0,1745	0,5161	20,61	0	r
181.	12,24	3,0	6,400	6,400	24,5085	-0,1678	0,5143	20,54	0	r
182.	12,31	3,1	6,200	6,200	24,5155	-0,1608	0,5155	20,59	0	r
183.	12,37	3,0	6,000	6,000	24,5224	-0,1539	0,5157	20,59	0	r
184.	12,44	3,1	5,800	5,800	24,5293	-0,1470	0,5158	20,60	0	r
185.	12,51	3,1	5,600	5,600	24,5362	-0,1401	0,5160	20,61	0	r
186.	12,57	3,2	5,400	5,400	24,5431	-0,1332	0,5162	20,61	0	r
187.	12,64	3,3	5,200	5,200	24,5502	-0,1261	0,5183	20,70	0	r

188.	12,72	3,1	5,000	5,000	24,5569	-0,1194	0,5165	20,63	0	r
189.	12,78	3,1	4,800	4,800	24,5637	-0,1126	0,5157	20,59	0	r
190.	12,85	3,1	4,600	4,600	24,5707	-0,1056	0,5168	20,64	0	r
191.	12,92	3,0	4,400	4,400	24,5776	-0,0987	0,5170	20,65	0	r
192.	12,99	3,1	4,200	4,200	24,5845	-0,0918	0,5171	20,65	0	r
193.	13,05	3,0	4,000	4,000	24,5915	-0,0848	0,5183	20,70	0	r
194.	13,12	4,3	3,800	3,800	24,5984	-0,0779	0,5184	20,70	0	r
195.	13,21	3,0	3,600	3,600	24,6053	-0,0710	0,5186	20,71	0	r
196.	13,28	3,0	3,400	3,400	24,6121	-0,0642	0,5178	20,68	0	r
197.	13,34	3,1	3,200	3,200	24,6190	-0,0573	0,5180	20,68	0	r
198.	13,41	3,1	3,000	3,000	24,6259	-0,0504	0,5181	20,69	0	r
199.	13,48	3,0	2,800	2,800	24,6328	-0,0435	0,5183	20,70	0	r
200.	13,54	3,1	2,600	2,600	24,6397	-0,0366	0,5185	20,70	0	r
201.	13,61	3,1	2,400	2,400	24,6465	-0,0298	0,5177	20,67	0	r
202.	13,68	3,1	2,200	2,200	24,6534	-0,0229	0,5178	20,68	0	r
203.	13,74	3,0	2,000	2,000	24,6603	-0,0160	0,5180	20,69	0	r
204.	13,81	3,0	1,800	1,800	24,6673	-0,0090	0,5191	20,73	0	r
205.	13,88	3,0	1,600	1,600	24,6742	-0,0021	0,5193	20,74	0	r
206.	13,94	3,0	1,400	1,400	24,6811	0,0048	0,5195	20,74	0	r
207.	14,01	3,0	1,200	1,200	24,6879	0,0116	0,5187	20,71	0	r
208.	14,07	3,1	1,000	1,000	24,6948	0,0185	0,5188	20,72	0	r
209.	14,14	3,7	0,800	0,800	24,7016	0,0253	0,5180	20,69	0	r
210.	14,22	3,0	0,600	0,600	24,7085	0,0322	0,5182	20,69	0	r
211.	14,29	3,0	0,400	0,400	24,7154	0,0391	0,5184	20,70	0	r
212.	14,35	3,0	0,200	0,200	24,7223	0,0460	0,5185	20,71	0	r
213.	14,42	3,7	0,000	0,000	24,7291	0,0528	0,5182	20,69	0	r
214.	14,50	3,8	-0,050	-0,050	24,7309	0,0546	0,5190	20,72	0	cb
215.	14,57	3,4	-0,100	-0,100	24,7327	0,0564	0,5196	20,75	0	cb
216.	14,65	2,5	-0,150	-0,150	24,7344	0,0581	0,5194	20,74	0	cb
217.	14,70	2,5	-0,200	-0,200	24,7361	0,0598	0,5191	20,73	0	cb
218.	14,76	1,8	-0,250	-0,250	24,7378	0,0615	0,5189	20,72	0	cb
219.	14,81	3,8	-0,300	-0,300	24,7395	0,0632	0,5187	20,71	0	cb
220.	14,89	3,7	-0,350	-0,350	24,7413	0,0650	0,5194	20,74	0	cb
221.	14,96	3,9	-0,400	-0,400	24,7430	0,0667	0,5192	20,73	0	cb
222.	15,04	3,9	-0,450	-0,450	24,7448	0,0685	0,5200	20,76	0	cb
223.	15,12	4,7	-0,500	-0,500	24,7464	0,0701	0,5187	20,72	0	cb
224.	15,22	3,7	-0,550	-0,550	24,7482	0,0719	0,5196	20,75	0	cb
225.	15,29	1,8	-0,600	-0,600	24,7499	0,0736	0,5193	20,74	0	cb
226.	15,34	3,7	-0,650	-0,650	24,7517	0,0754	0,5200	20,77	0	cb
227.	15,42	3,8	-0,700	-0,700	24,7533	0,0770	0,5188	20,72	0	cb
228.	15,50	1,7	-0,750	-0,750	24,7551	0,0788	0,5196	20,75	0	cb
229.	15,54	3,7	-0,800	-0,800	24,7568	0,0805	0,5194	20,74	0	cb
230.	15,62	3,8	-0,850	-0,850	24,7585	0,0822	0,5192	20,73	0	cb
231.	15,70	1,9	-0,900	-0,900	24,7602	0,0839	0,5190	20,73	0	cb
232.	15,75	3,9	-0,950	-0,950	24,7621	0,0858	0,5206	20,79	0	cb
233.	15,83	1,8	-1,000	-1,000	24,7638	0,0875	0,5204	20,78	0	cb
234.	15,87	2,2	-1,050	-1,050	24,7655	0,0892	0,5198	20,76	0	cb
235.	15,93	3,8	-1,100	-1,100	24,7671	0,0909	0,5195	20,74	0	cb
236.	16,01	3,9	-1,150	-1,150	24,7690	0,0927	0,5203	20,78	0	cb
237.	16,09	3,8	-1,200	-1,200	24,7707	0,0944	0,5205	20,78	0	cb
238.	16,17	4,7	-1,250	-1,250	24,7724	0,0961	0,5202	20,77	0	cb
239.	16,26	3,9	-1,300	-1,300	24,7742	0,0979	0,5210	20,80	0	cb
240.	16,34	3,7	-1,350	-1,350	24,7758	0,0995	0,5198	20,76	0	cb
241.	16,42	3,9	-1,400	-1,400	24,7776	0,1013	0,5205	20,79	0	cb
242.	16,50	3,7	-1,450	-1,450	24,7793	0,1030	0,5203	20,78	0	cb
243.	16,58	2,4	-1,500	-1,500	24,7809	0,1047	0,5195	20,75	0	cb
244.	16,64	2,2	-1,550	-1,550	24,7827	0,1064	0,5199	20,76	0	cb
245.	16,69	3,8	-1,600	-1,600	24,7845	0,1082	0,5206	20,79	0	cb
246.	16,77	3,7	-1,650	-1,650	24,7863	0,1100	0,5210	20,80	0	cb
247.	16,85	2,5	-1,700	-1,700	24,7878	0,1115	0,5192	20,73	0	cb
248.	16,91	3,9	-1,750	-1,750	24,7896	0,1133	0,5199	20,76	0	cb
249.	16,99	2,1	-1,800	-1,800	24,7912	0,1149	0,5187	20,71	0	cb
250.	17,04	3,9	-1,850	-1,850	24,7930	0,1167	0,5195	20,74	0	cb
251.	17,12	1,6	-1,900	-1,900	24,7944	0,1181	0,5164	20,62	0	cb
252.	17,17	1,9	-1,950	-1,950	24,7961	0,1198	0,5161	20,61	0	cb
253.	17,22	1,6	-2,000	-2,000	24,7975	0,1212	0,5129	20,48	0	cb
254.	17,26	1,8	-2,050	-2,050	24,7988	0,1225	0,5088	20,32	0	cb
255.	17,31	1,7	-2,100	-2,100	24,8001	0,1238	0,5045	20,15	0	cb
256.	17,36	3,8	-2,150	-2,150	24,8011	0,1248	0,4975	19,87	0	cb
257.	17,44	1,8	-2,200	-2,200	24,8019	0,1256	0,4885	19,51	0	cb
258.	17,48	1,8	-2,250	-2,250	24,8027	0,1264	0,4794	-	0	cb

Meldungen

Die Rückzugs- bzw. Receding- Bewegung ist aus 3 Zügen zusammengesetzt.

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.

IMPro Execution & Audit-Trail

Data created during execution of the IMPro "ContactAngle_atConstantLevel, 29.08.23, 104997", type 4/4. Time Period of the Accomplishment: Sep., 04. 2023 between 17:36:17 and 18:00:03, elapsed time: 20 minutes. IMPro finished as projected. The complete Report first was presented on Sep., 05.23 at 21:50. Audit-Log: The Original data is unchanged, nevertheless there are entries to the Log, made while the IMPro was executing:

Start of this IMPro 17:41:35, - Backup of the IMPro configuration:

Time Variables: Abs. Positions/Way: Immersion_Depth 20mm, Platform_StartPosition 85mm.

Rel. Positions/Way: FeedRateAdv 0,2mm, FeedRateRec -0,2mm, FeedRate_for_adv_rec_turn -0,050mm.

Others: Determin_0_at_Repetition -1 [Y/N].StirringTime 0s. Stirrer-Speed 0rps. Record_Air_Density -1, Temperature-Outside-Warning 0, Automatic_Thermostat_available -1.

ab 8. Wdh mit Entnahme und Abtupfung ...*

#Wilmsy-Plate-Sequence (erstes speedup, dann speedup dyn) : 1x stat, dann speedup ... mm/s dyn, Besch.g = 43 [%]; Sequ.Nr° 1/22; _Equi_Time: 0,350s, _Equi_Crit: 0,0001g, _Equi_loops: 5s, _Equi_loopsRepeater: 2 [n]x. Immersion_Depth: 20mm, ConditioningTime: 180s.v5,26=74,1µL, Measurement : CLT STATIC, PumpN°1 [n], Vol. 2,50 [cm³], FüllVolumen 0,5 [cm³], FreiVolumen 2 [cm³], VolBilanz 0,4259, PFlussRate 25,0µL/s, DichteDerFlüssigkeit 0,69191 [g/cm³].

v5,35=-9,98µL,v5,42=-9,98µL,v5,49=-9,98µL,v5,56=-9,98µL,v5,62=-9,98µL,v5,69=-9,98µL,v5,75=-9,98µL,v5,83=-9,98µL,v5,90=-9,98µL,v5,97=-9,98µL,v6,03=-9,98µL,v6,10=-9,98µL,v6,17=-9,98µL,v6,24=-9,98µL,v6,30=-9,98µL,v6,37=-9,98µL,v6,44=-9,98µL,v6,50=-9,98µL,v6,59=-9,98µL,v6,65=-9,98µL,v6,72=-9,98µL,v6,78=-9,98µL,v6,85=-9,98µL,v6,92=-9,98µL,v6,98=-9,98µL,v7,05=-9,98µL,v7,12=-9,98µL,v7,18=-9,98µL,v7,25=-9,98µL,v7,32=-9,98µL,v7,39=-9,98µL,v7,45=-9,98µL,v7,52=-9,98µL,v7,59=-9,98µL,v7,66=-9,98µL,v7,72=-9,98µL,v7,79=-9,98µL,v7,86=-9,98µL,v7,92=-9,98µL,v7,99=-9,98µL,v8,06=-9,98µL,v8,12=-9,98µL,v8,19=-9,98µL,v8,25=-9,98µL,v8,32=-9,98µL,v8,40=-9,98µL,v8,46=-9,98µL,v8,53=-9,98µL,v8,59=-9,98µL,v8,66=-9,98µL,v8,72=-9,98µL,v8,80=-9,98µL,v8,87=-9,98µL,v8,93=-9,98µL,v9,00=-9,98µL,v9,06=-9,98µL,v9,13=-9,98µL,v9,21=-9,98µL,v9,27=-9,98µL,v9,34=-9,98µL,v9,41=-9,98µL,v9,48=-9,98µL,v9,55=-9,98µL,v9,64=-9,98µL,v9,71=-9,98µL,v9,79=-9,98µL,v9,86=-9,98µL,v9,92=-9,98µL,v9,99=-9,98µL,v10,06=-9,98µL,v10,12=-9,98µL,v10,19=-9,98µL,v10,27=-9,98µL,v10,33=-9,98µL,v10,41=-9,98µL,v10,48=-9,98µL,v10,54=-9,98µL,v10,61=-9,98µL,v10,67=-9,98µL,v10,74=-9,98µL,v10,81=-9,98µL,v10,87=-9,98µL,v10,94=-9,98µL,v11,01=-9,98µL,v11,07=-9,98µL,v11,14=-9,98µL,v11,20=-9,98µL,v11,27=-9,98µL,v11,33=-9,98µL,v11,41=-9,98µL,v11,47=-9,98µL,v11,54=-9,98µL,v11,60=-9,98µL,v11,67=-9,98µL,v11,74=-9,98µL,v11,80=-9,98µL,v11,87=-9,98µL,v11,93=-9,98µL,v12,00=-9,98µL,v12,06=-9,98µL,v12,13=-2,50µL,v12,19=2,50µL,v12,25=2,50µL,v12,31=2,50µL,v12,38=2,50µL,v12,44=2,50µL,v12,50=2,50µL,v12,57=2,50µL,v12,63=2,50µL,v12,69=2,50µL,v12,75=2,50µL,v12,82=2,50µL,v12,88=2,50µL,v12,94=2,50µL,v13,01=2,50µL,v13,07=2,50µL,v13,13=9,98µL,v13,19=9,98µL,v13,25=9,98µL,v13,34=9,98µL,v13,42=9,98µL,v13,51=9,98µL,v13,57=9,98µL,v13,64=9,98µL,v13,70=9,98µL,v13,77=9,98µL,v13,84=9,98µL,v13,92=9,98µL,v13,98=9,98µL,v14,06=9,98µL,v14,12=9,98µL,v14,19=9,98µL,v14,26=9,98µL,v14,33=9,98µL,v14,39=9,98µL,v14,47=9,98µL,v14,53=9,98µL,v14,60=9,98µL,v14,67=9,98µL,v14,73=9,98µL,v14,80=9,98µL,v14,87=9,98µL,v14,94=9,98µL,v15,01=9,98µL,v15,08=9,98µL,v15,14=9,98µL,v15,21=9,98µL,v15,29=9,98µL,v15,36=9,98µL,v15,44=9,98µL,v15,51=9,98µL,v15,59=9,98µL,v15,65=9,98µL,v15,72=9,98µL,v15,79=9,98µL,v15,86=9,98µL,v15,93=9,98µL,v16,00=9,98µL,v16,07=9,98µL,v16,13=9,98µL,v16,20=9,98µL,v16,26=9,98µL,v16,33=9,98µL,v16,40=9,98µL,v16,47=9,98µL,v16,54=9,98µL,v16,61=9,98µL,v16,67=9,98µL,v16,74=9,98µL,v16,81=9,98µL,v16,87=9,98µL,v16,95=9,98µL,v17,02=9,98µL,v17,09=9,98µL,v17,17=9,98µL,v17,24=9,98µL,v17,31=9,98µL,v17,38=9,98µL,v17,45=9,98µL,v17,53=9,98µL,v17,59=9,98µL,v17,66=9,98µL,v17,73=9,98µL,v17,79=9,98µL,v17,86=9,98µL,v17,93=9,98µL,v18,00=9,98µL,v18,07=9,98µL,v18,14=9,98µL,v18,21=9,98µL,v18,27=9,98µL,v18,34=9,98µL,v18,41=9,98µL,v18,50=9,98µL,v18,56=9,98µL,v18,63=9,98µL,v18,70=9,98µL,v18,76=9,98µL,v18,83=9,98µL,v18,90=9,98µL,v18,96=9,98µL,v19,03=9,98µL,v19,10=9,98µL,v19,16=9,98µL,v19,23=9,98µL,v19,29=9,98µL,v19,36=9,98µL,v19,43=9,98µL,v19,51=9,98µL,v19,57=9,98µL,v19,64=9,98µL,v19,71=9,98µL,v19,79=0,593µL,v19,87=2,60µL,v19,94=2,59µL,v20,00=2,46µL,v20,05=2,44µL,v20,10=2,47µL,v20,18=2,46µL,v20,25=2,60µL,v20,34=2,46µL,v20,42=2,60µL,v20,51=2,31µL,v20,59=2,62µL,v20,63=2,44µL,v20,71=2,60µL,v20,79=2,31µL,v20,84=2,60µL,v20,91=2,46µL,v20,99=2,47µL,v21,04=2,46µL,v21,12=2,73µL,v21,17=2,46µL,v21,22=2,40µL,v21,30=2,44µL,v21,38=2,62µL,v21,46=2,51µL,v21,55=2,46µL,v21,63=2,60µL,v21,71=2,31µL,v21,79=2,60µL,v21,87=2,46µL,v21,93=2,37µL,v21,98=2,54µL,v22,06=2,60µL,v22,14=2,54µL,v22,20=2,23µL,v22,28=2,60µL,v22,33=2,31µL,v22,41=2,60µL,v22,46=2,04µL,v22,51=2,44µL,v22,56=2,02µL,v22,60=1,89µL,v22,65=1,85µL,v22,73=1,46µL,v22,78=1,16µL,v22,82=1,16µL,v22,87=0,650µL,v22,91=0,506µL,

The Number **23292** refers to the Recordset in the Database **'imeterData39'** where all Information can be retrieved at any time.

Prüfmittel

Das Wägesystem (WZA224) wurde 1,9 Stunden vor dieser Messung von Augsburg-Lab justiert. Die letzte vollständige Prüfung der Positioniervorrichtung von **IMETER** (ID23903733) erfolgte am 01.08.23. **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} vgl. Tabelle unten; Schwerebeschleunigung g 9,80769 m/s². Pt100-Temperaturmessung: Auflösung 0,001 K, Messunsicherheit $\pm 0,01$ K, R° 100.0056 Ω , Kalibrierintervall 30 min (BN°1, -41/200°C, 3S, FS15,8, Korrekturfunktion: -0,0054 +0,997591 $\cdot\vartheta$ +2,20165E-05 $\cdot\vartheta^2$ -4,78431E-08 $\cdot\vartheta^3$). Die Messauflösung der sekundären Temperaturmessung beträgt 0,01 K, die Unsicherheit 0,03 K. Akquisitions-Softwareversion IMETER 7.4.21, LizenzN° *3037-4759*, W. 6.2,9200- Betriebssystem auf PC Ser.N°6995684 (C, SSD).

Meteorologische Angaben, Luftdichte:

Time [min]	ϕ [%]	T_a [°C]	p_a [kPa]	ρ_{air} [kg/m ³]
0,2	48,4	28,12	96,596	1,10923

Obige Zusammenstellung gibt die Aufzeichnung der Atmosphärendaten für den Aufstellort wieder; darin bedeuten ϕ relative Luftfeuchte (r.H.), T_a Lufttemperatur und p_a absoluter Luftdruck, ρ_{air} die Luftdichte; Die Luftdichte wird dabei aus den Druck-, Temperatur- und Luftfeuchtwerten berechnet.