

SWTest Conference

Harald Ibele, Austin Ibele, Iftakharul Islam – Sigma Sensors Sebastian Giessmann - MPI



POSTER



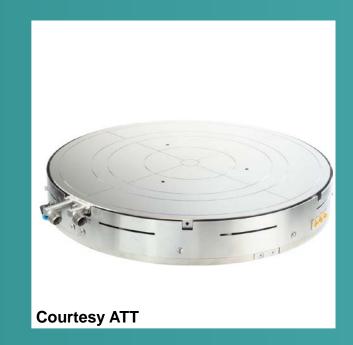
Sigma Sensors
Temperature Calibration
Laboratories GmbH

AUTOMATED TEMPERATURE CALIBRATION ROUTINE FOR PROBER CHUCKS (-60C to +200C)

For ALL analytical and production wafer probers / chucks varying levels of automation: manual, semi, fully automated









,"Channel 1 Ave. (C)","Channel 2 Ave. (C)","Channel 3 Ave. (C)","C 00:00:00,"24.027","23.854","24.021","23.837","23.809","23.420" 00:00:10,"24.030","23.858","24.023","23.843","23.810","23.421" 00:00:20,"24.028","23.858","24.020","23.838","23.811","23.419" 00:00:30,"24.030","23.858","24.023","23.843","23.811","23.419" 00:00:30,"24.030","23.858","24.023","23.844","23.812","23.419" 00:00:40,"24.031","23.854","24.026","23.841","23.812","23.421" 00:00:50,"24.029","23.860","24.028","23.842","23.813","23.423" 00:01:00,"23.993","23.842","24.002","23.824","23.797","23.419" 00:01:10,"23.847","23.777","23.902","23.745","23.779","23.389" 00:01:20,"23.592","23.622","23.689","23.561","23.579","23.323" 00:01:30,"23.218","23.369","23.371","23.290","23.324","23.200" 00:01:40,"22.756","23.010","22.961","22.916","22.979","23.018" 00:01:50,"22.223","22.582","22.488","22.482","22.537","22.768" 00:02:00,"21.619","22.070","21.910","21.942","22.021","22.452" 00:02:10,"20.975',"21.473","21.277","21.358","21.443","22.081" 00:02:20,"20.270","20.825","20.619","20.725',"20.815","21.676" 00:02:30,"19.563","20.171","19.937","20.032","20.153","21.199" 00:02:40,"18.824","19.471","19.209","19.347","19.435","20.691" 00:03:00,"17.308","18.731","18.468","18.608","18.713","20.142" 00:03:00,"17.308","17.799","17.706","17.867","17.985","19.570" 00:03:20,"15.832","16.519","16.521","16.388","16.494","17.8392" 00:03:20,"15.832","16.519","16.221","16.388","16.494","18.8322" 00:03:30,"15.069","15.776","15.487","15.6557","15.760","17.670"

SOFTWARE COM INTERFACE

all pictures are property of their respective Trademark owners

Analytical / automated prober w/ chuck + calibration wafer, output data and sw/com interface

MEASUREMENT SET-UP

THERMAL SOURCE: REFERENCE:

- MPI 300mm analytical wafer prober
- SIGMA SENSORS 300mm calibration wafer,

ISO/IEC17025:2017 accredited calibrated

- PICO logging hardware interface
- MAESMATIC software and comm interface

SIMPLE STEPS

Wafer set-up

5min

- Enter temperature and logging profile
- Push START button
- Prober executes prescribed temperature profile
- Relevant data is extracted
- Set temp, average, offset
- Interface feeds offsets back into prober / controller
- Measuring sequence repeated (method 2 in-situ offset adjust)
- Data / certificate output
- Remove wafer

5min

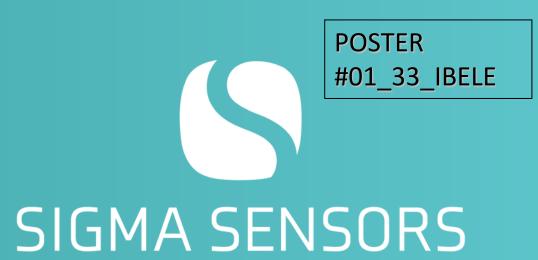




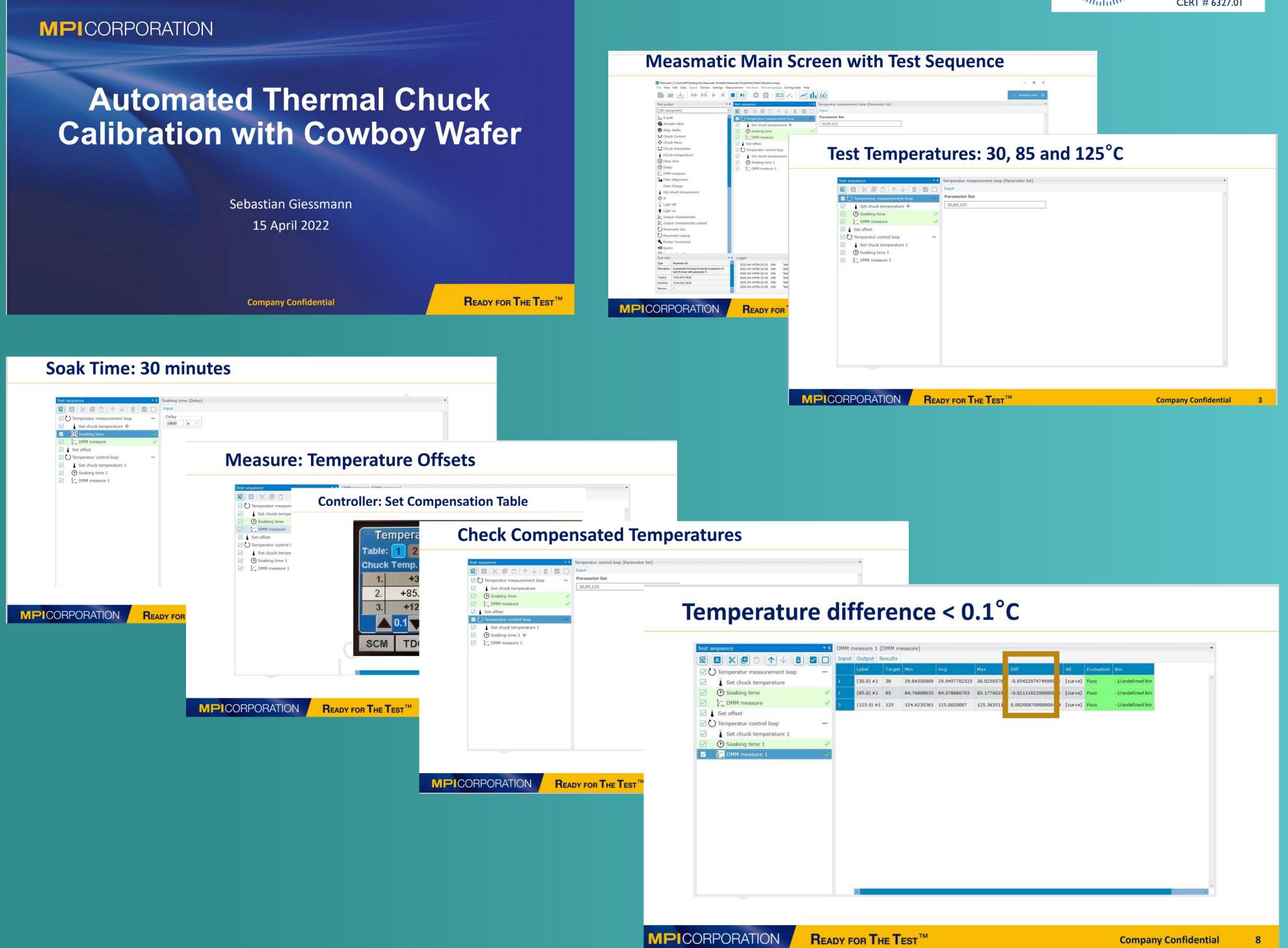




METHOD 1

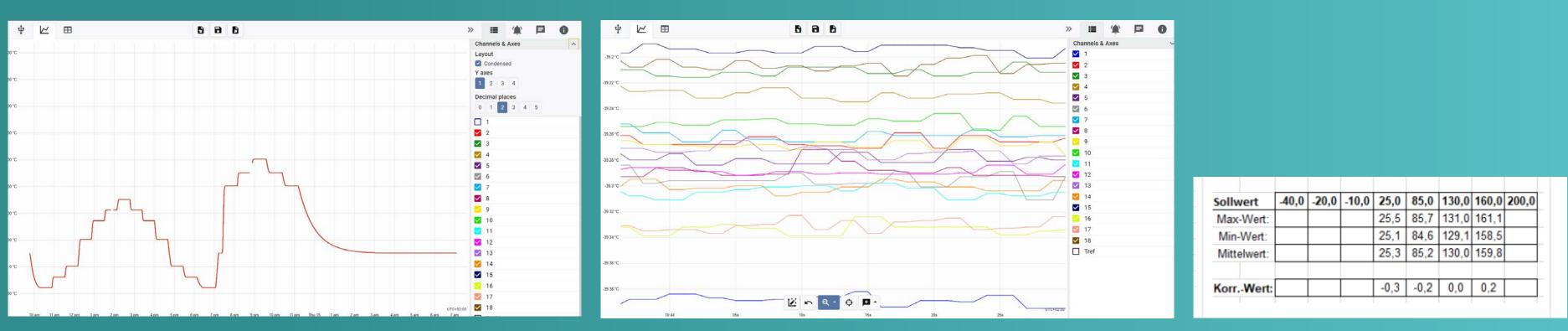




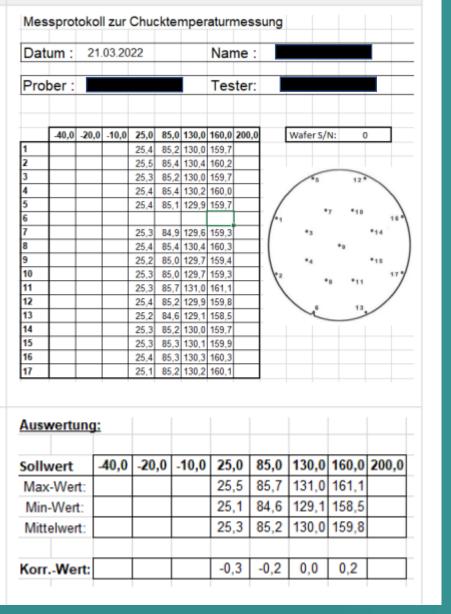


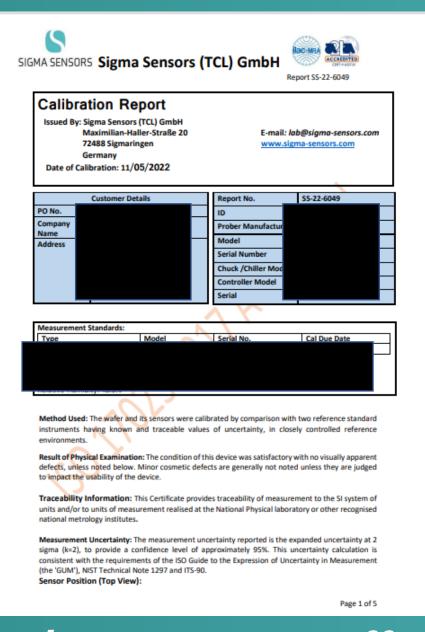
METHOD 2: LAB2GO / advanced options

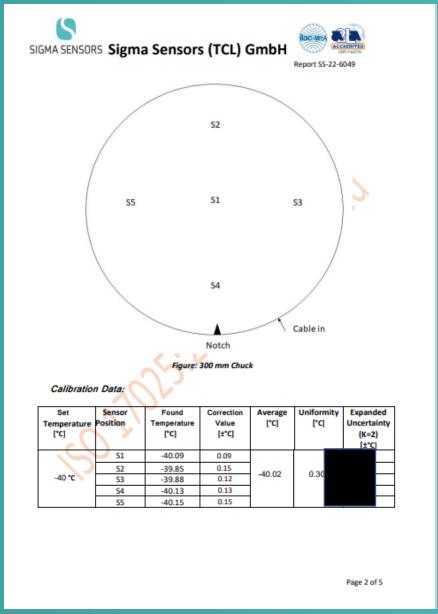
Additional continuous logging, automated data output, optional correction + certificate Automated IIoT Remote Calibration Option (ACR, RCR), ISO/IEC17025:2017 accredited



continuous logging, automated data output + processing = mean. min, max, offset





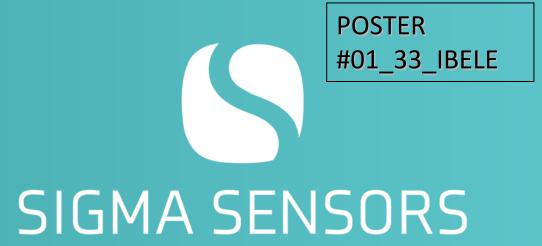


Set Temperature	Sensor	Found	Correction	Average	Uniformity	Expanded
		Temperature	Value	[°C]	[°C]	Uncertaint
[°C]	FUSICION	[°C]	[±°C]	14	19	(K=2)
		101	(2 4)			[±°C]
-25 °C	S1	-25.14	0.14	-25.08		
	52	-24.94	0.06		0.24	
	53	-24.99	0.01			
	S4	-25.18	0.18			
	S5	-25.15	0.15			
						0.
Set	Sensor	Found	Correction	Average	Uniformity	Expanded
Temperature	Position	Temperature	Value	[°C]	[°C]	Uncertaint
[*c]		[*c]	[±°C]	. (0,	(K=2) [±°C]
25 °C	S1	25.01	0.01	-4.		
	52	25.03	0.03	25.02	0.04	
	53	25.04	0.04	25.02	0.04	
	\$4	25.00	0.00			
	S5	25.02	0.02			
			/ /	•		
Set	Sensor	Found	Correction	Average	Uniformity	Expanded
Temperature	Position	Temperature	Value	[°C]	[°C]	Uncertaint
[°C]		[,c]	[±°C]			(K=2)
85 °C	S1 /	85.13	0.13	85.04	0.42	[±°C]
	52	84.74	0.26			
	53	85.10	0.10			
	S4	85.08	0.08			
	\$5	85.16	0.16	1		
	/ >		•			
Set	Sensor	Found	Correction	Average	Uniformity	Expanded
Temperature	Position	Temperature	Value	[°C]	[*c]	Uncertaint
. c.mperuture		[*c]	[±°C]			(K=2) [±°C]
[,c]		125.34	0.34	125 21	0.42	
	S1					
[*c]	S1 S2	124.93	0.07	125 21	0.42	
	52 53	125.35	0.35	125.21	0.42	
[*c]	52			125.21	0.42	

Basic data (mean, min /max, range, offset) in protocol format or certificate output ISO17025:2017 accredited optional



RESULTS





Works on first try
Easy to implement, even DIY

OBSERVATIONS

- Platform independent
- Prober / chuck communication command sets are published
- Multiple options to control prober / chuck
- HW/SW Interface required
- Measurement data output csv
- Open-source SW offers customization options
- Static and dynamic data averages possible
- Raw data output to accredited certificates possible

ADVANTAGES

Standardize processes across multiple platforms
Provide consistent measurement results
Reduce bias and lost data
Ensure traceability and compliance
Fulfill documentary requirements
Reduce manpower requirements by up to 95%
outstanding ROI

About SIGMA SENSORS

SIGMA SENSORS (TCL) supplies the global semiconductor industry with surface temperature measurement and calibration solutions ranging from free-standing 1-18 sensor calibration wafers to complete, advanced automated calibration systems. SIGMA SENSORS provides ISO/IEC17025:2017 accredited and / or NIST traceable on-site / remote calibration services for up to 8 waferprobe systems parallel.

SIGMA SENSORS (TCL) GmbH Sigmaringen / Germany

+49-1520-7048888 / +1(214)347-4688 info@Sigma-sensors.com