



# Prometheus

## Testing in HV Lab

OIT5001

Contini

Confidential

# Agenda

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## List of tests performed

- 1.1 UM2 NaCl 300V stainless steel electrodes
- 1.2 UM2 NaHCO<sub>3</sub> 700V stainless steel electrodes
- 1.3 UM2 NaCl 300V with resistor
- 1.4 UM2 NaHCO<sub>3</sub> 700V resistor
- 1.5 UM2 NaCl 300V stainless steel electrodes
- 1.6 UM2 NaHCO<sub>3</sub> 700V stainless steel electrodes
  
- 2.1 NaCl 1000V steel electrodes
- 2.2 equivalent to 2.1
- 2.3 UM3 NaCl 900V Ti electrodes
- 2.4 UM3 NaHCO<sub>3</sub> Ni electrodes

2

## Prometheus Team:

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3

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Davide Pamio  
Michele Contini  
Maurizio Suzzi

Data available on: [Sharepoint](#)

# System

## Systems tested:

UM 2.0  
UM 2.4 with gas storage chamber  
UM 3.0

Tests conducted with UM 2.0 were aimed at evaluating heat generation.

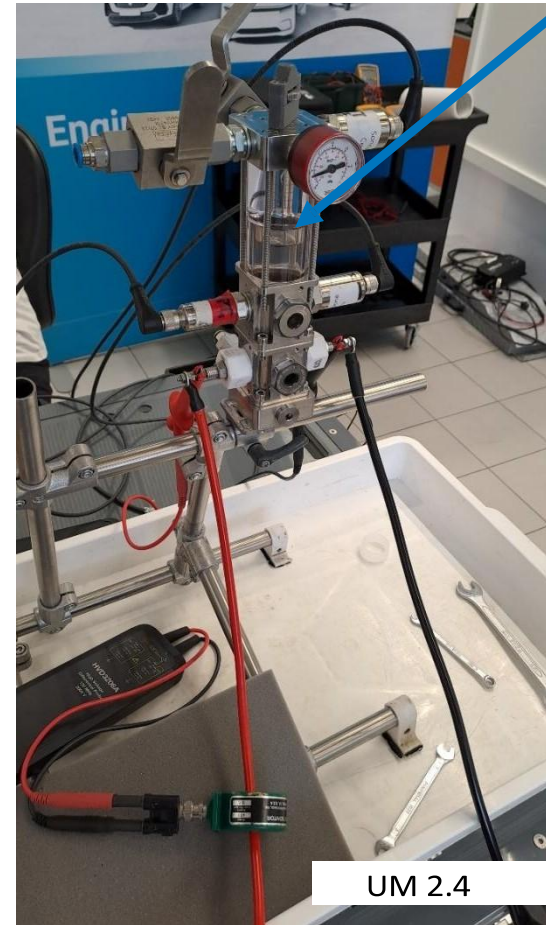
Tests performed with UM 2.4 and UM 3.0 were designed to quantify the concentration of the hydrogen produced and the corresponding mass.

Toroidal  
current sensor (A)

Voltage probe

Reactor

Gas storage  
chamber



# Instrument setup

An evaluation of the measurement sensors used by Prometheus has been conducted.

A summary of the evaluation is provided on the side.

Details can be found in the report:

AVL WP1 [Prometheus WP1 Deliverable](#)  
Released on March 6<sup>th</sup>, 2025

## 3. Verification of Sensor Selection

Parameter	Sensor Used	Adequacy
Temperature	RTD PT1000 BFT0005 (Mercury thermometer)	✓ Correct choice
Pressure	Balluff sensors (0–100 bar, –1/10 bar)	✓ Adequate
Gas	Micro-GC Agilent 490	✓ Correct choice
Current	• Pearson 411 (5 kA pk) • Rigol RP1002C (70 A)	✓ Essential
Voltage	Pico TA042 (1400 V)	✓ Essential
Thermal distribution	Optris Xi 400 thermal camera	✓ Ideal for thermal dispersion analysis



# 1.1 UM2.0

(1% NaCl solution, AISI 316L electrodes, 300 V power supply, equivalent power 2.25W)

## Summary of test conditions

Conditions									
Voltage (V)	Electrode distance (mm)	Electrode material	Electrode shape	Frequency (Hz)	Number of Shots	Solute	Solvent	Concentration	Reactor Version
300	<i>Details available upon signing a non-disclosure agreement (NDA) – patent application pending</i>					NaCl	H <sub>2</sub> O	1%	2

Quantities measured during the experiment							
Size	Acquired	Unit	Description	Initials	Intermediate	Finals	Other
Ambient T	┐	°C	Ambient temperature	24.5	24.5	24.5	
Tr	┐	°C	Internal temperature	19.9	23.1	22	
Pr	┐	bar	Internal pressure	0	0.76	0.69	
T1	┐	°C	Lower surface temperature	25.1	25.8	26	
T2	┐	°	Intermediate surface temperature	24.9	26.8	26.4	
T3	┐	°C	Upper surface temperature	24.9	26.4	26.4	

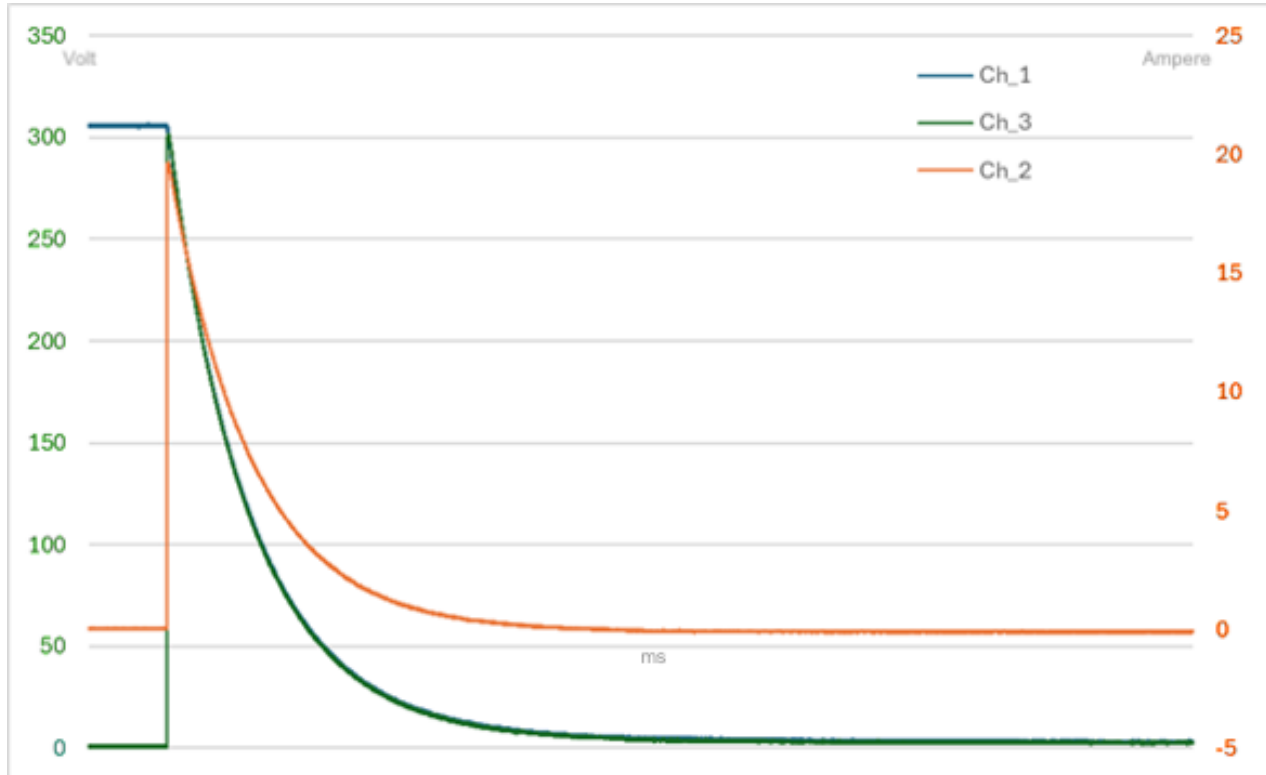
Power cycle duration: 1200 seconds  
Post-power monitoring period: 600 seconds  
Overall test observation period: 1800 seconds

### Electrical input measurements

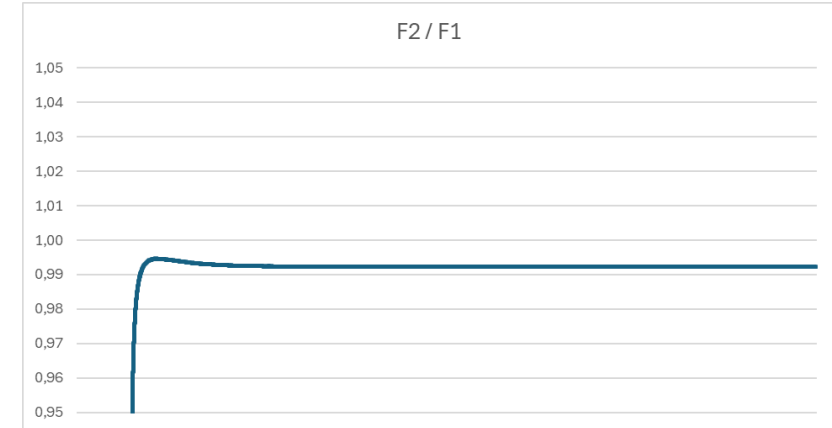
Oscilloscope  
Ch1: V Capacitors Ch2: I transformer  
Ch3: V\_reactor  
 $F_1 = \int Ch_1 * Ch_2 dt$   
 $F_2 = \int Ch_2 * Ch_3 dt$

# 1.1 UM2.0 – Electrical measurement results

(1% NaCl solution, AISI 316L electrodes, 300 V power supply, equiv. pot. 2.25W)



Integrals of the V (Ch1 and Ch3) and I (Ch2) curves over time  
calculate the energy supplied by the chamber.



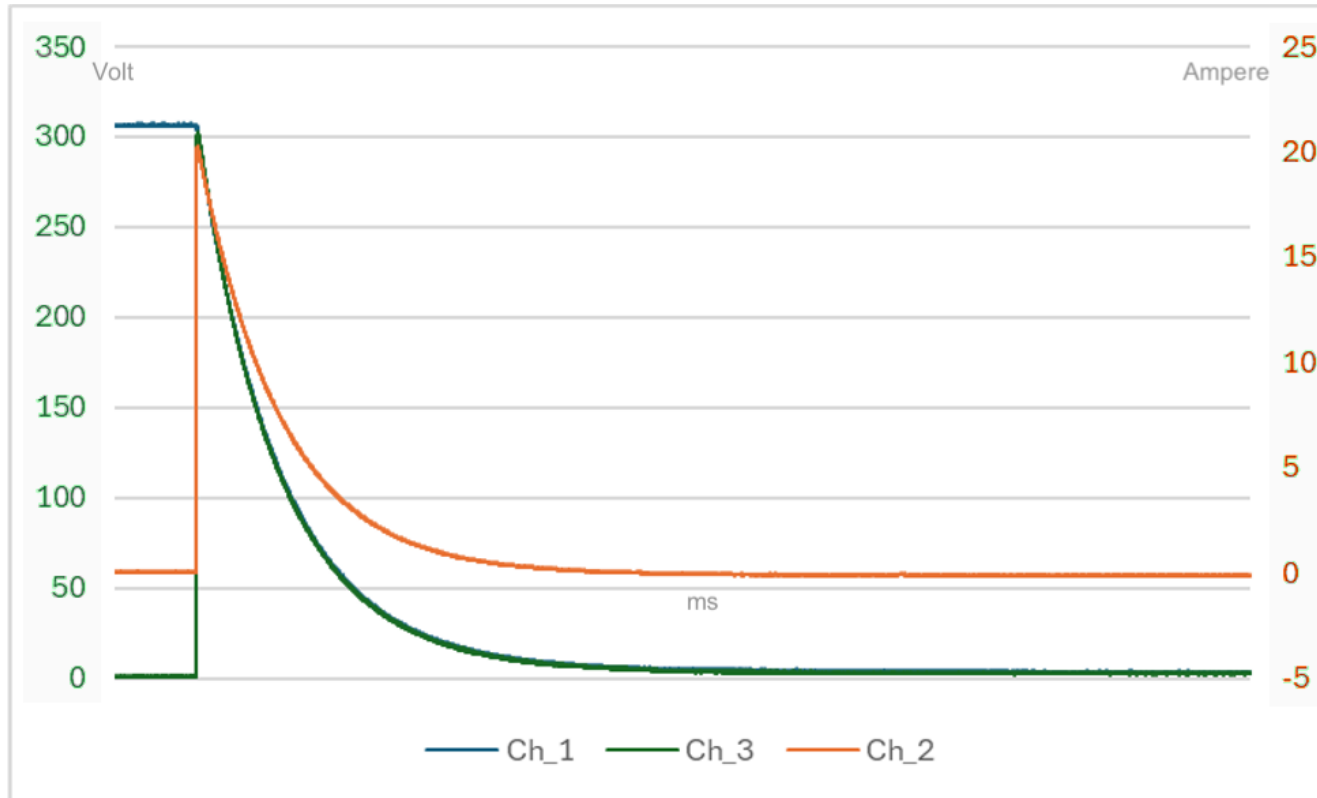
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Last modification: May 21, 2025, 17:07
- C2-00-00100  
Last modification: May 21, 2025, 17:07
- C3-00-00100  
Last modification: May 21, 2025, 17:07
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Last modification: May 21, 2025, 17:07
- F2-00-00100  
Last modification: May 21, 2025, 17:07

shot 00100

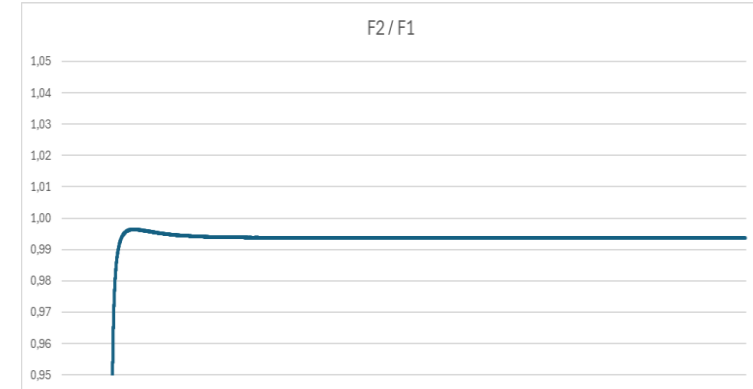
**Oscilloscope**  
Ch1: V Capacitors  
Ch2: I transformer  
Ch3: V\_reactor  
 $F_1 = \int Ch_1 * Ch_2 dt$   
 $F_2 = \int Ch_2 * Ch_3 dt$

# 1.1 UM2.0 – Electrical measurement results

(1% NaCl solution, AISI 316L electrodes, 300 V power supply, equiv. pot. 2.25W)



The integrals of the V (Ch1 and Ch3) and I (Ch2) curves over time calculate the energy supplied to the chamber.



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- C2-00-00500  
Last modification: May 21, 2025, 17:24
- C3-00-00500  
Last modification: May 21, 2025, 17:24
- F1-00-00500  
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- F2-00-00500  
Last modification: May 21, 2025, 17:24

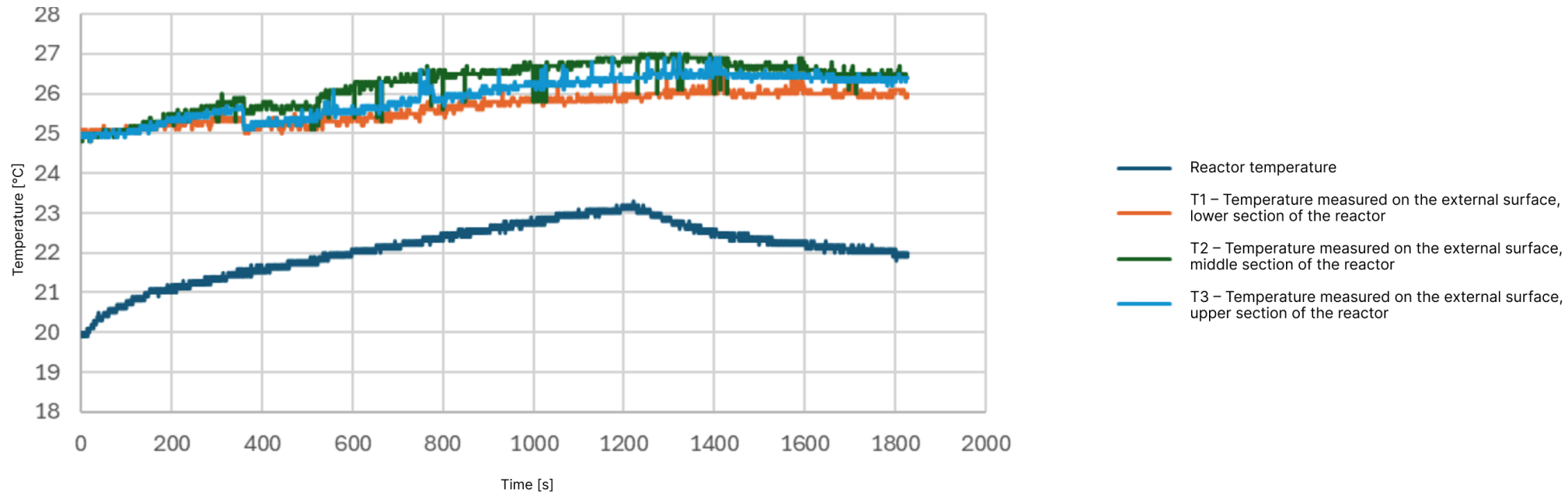
shot 00500

**Oscilloscope**  
Ch1: V Capacitors  
Ch2: I transformer  
Ch3: V\_reactor  
 $F_1 = \int Ch_1 * Ch_2 dt$   
 $F_2 = \int Ch_2 * Ch_3 dt$

# 1.1 UM2.0 – Temperature results

(1% NaCl solution, AISI 316L electrodes, 300 V power supply, equiv. pot. 2.25W)

Trend of experimental curves

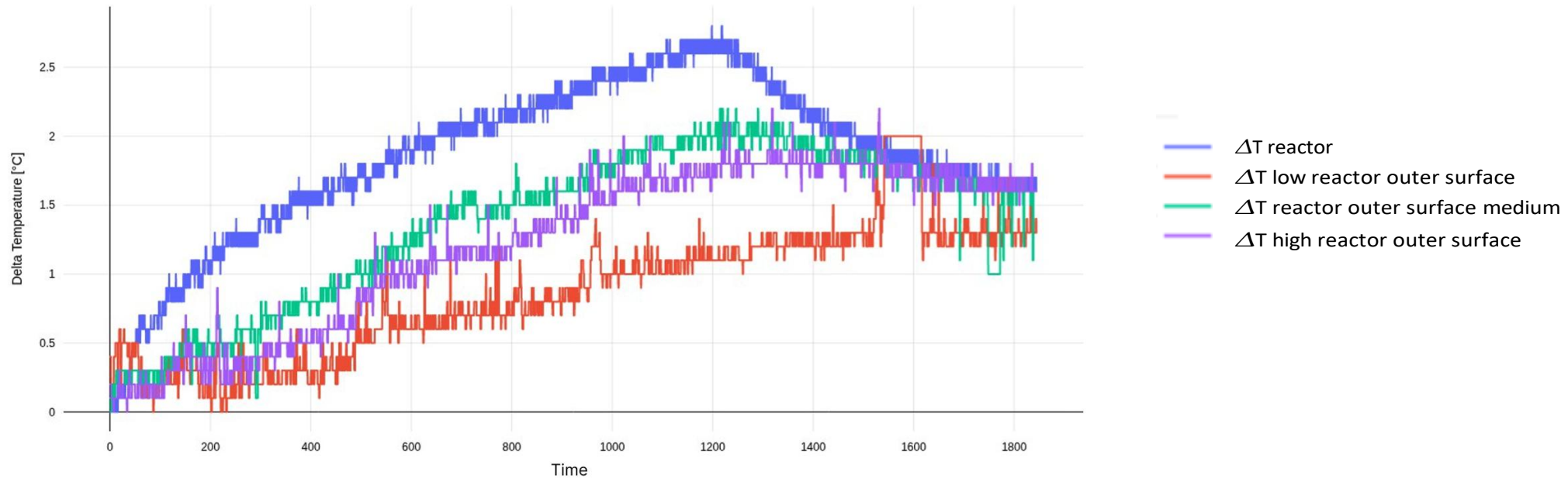




# 1.1 UM2.0 – Delta temperature

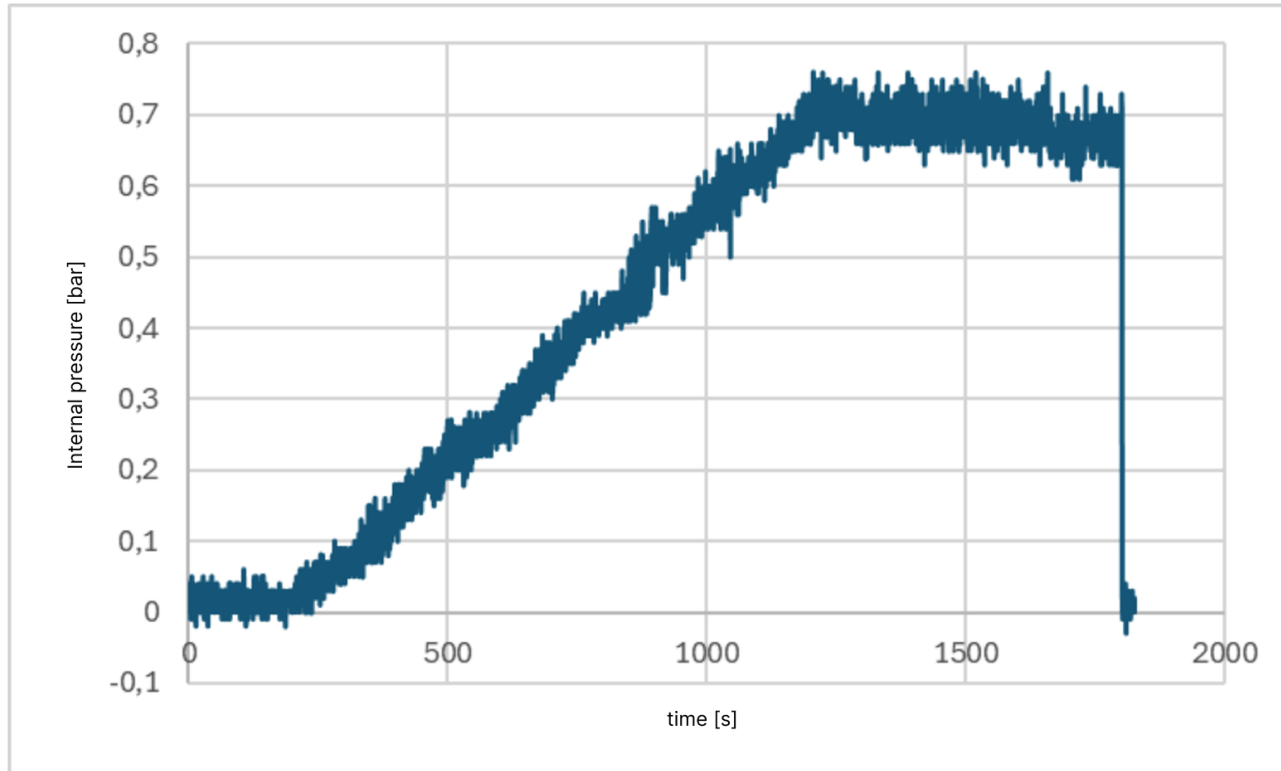
(1% NaCl solution, AISI 316L electrodes, 300 V power supply, equiv. pot. 2.25W)

MEASUREMENT FROM MEASUREMENT



# 1.1 UM2.0 – Pressure results

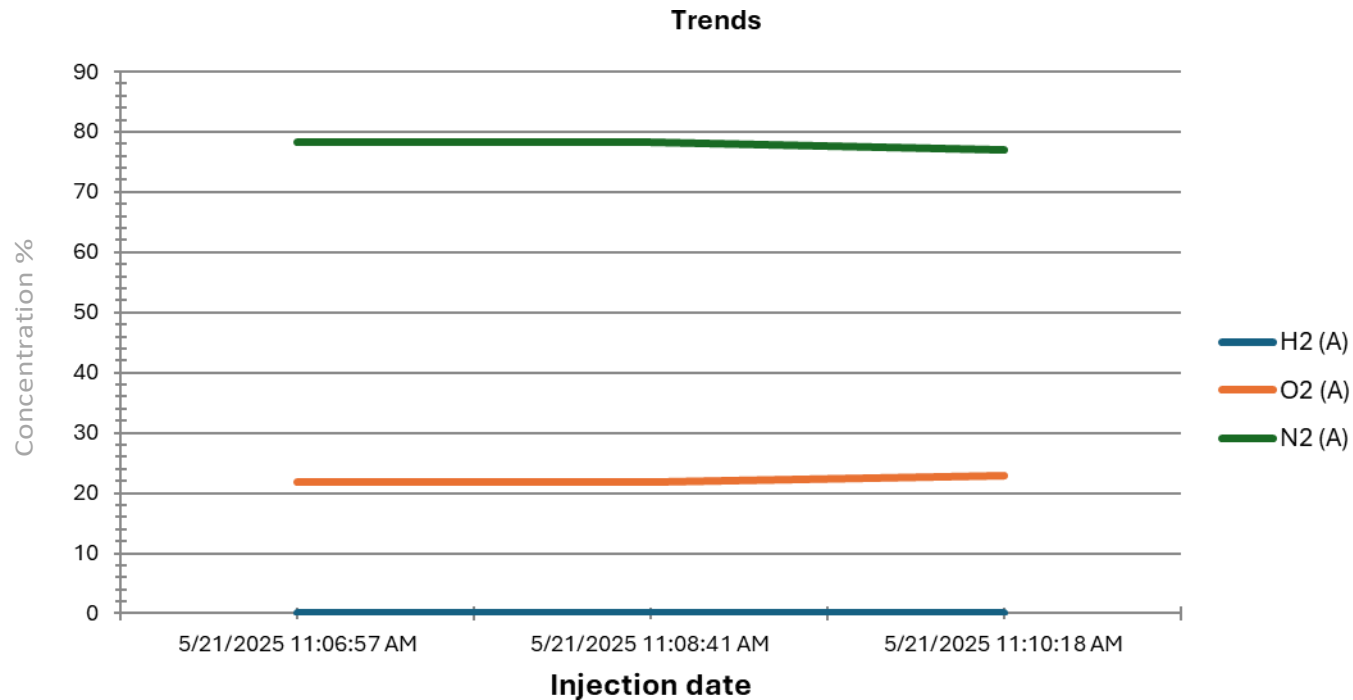
(1% NaCl solution, AISI 316L electrodes, 300 V power supply, equivalent power 2.25W)



The pressure indicated for the production of  $H_2$   
See test **2.2**

# 1.1 UM2.0 – Concentration results

(1% NaCl solution, AISI 316L electrodes, 300 V power supply, equiv. pot. 2.25W)



See also test 2.2

# 1.2 UM2.0

(1% NaHCO<sub>3</sub> solution, AISI 316L electrodes, 700 V power supply)

Summary of test conditions:

Conditions									
Voltage (V)	Electrode distance (mm)	Electrode material	Electrode shape	Frequency (Hz)	Number of Shots	Solute	Solvent	Concentration	Reactor Version
700	<i>Details available upon signing a non-disclosure agreement (NDA) – patent application pending</i>					NaHCO3	H <sub>2</sub> O	1%	2

Measured quantities during the experiment							
Quantity	Acquired	Unit	Description	Initial	Intermediate	Final	Other
T environment	<input type="checkbox"/>	°C	Ambient temperature	24,5	24,5	24,5	
Tr	<input type="checkbox"/>	°C	Internal temperature	23	35,6	29,6	
Pr	<input type="checkbox"/>	barg	Internal pressure	0	2,12	1,86	
T1	<input type="checkbox"/>	°C	Lower surface temperature	26,8	29,9	30,3	
T2	<input type="checkbox"/>	°C	Intermediate surface temperature	27,1	36	32,6	
T3	<input type="checkbox"/>	°C	Upper surface temperature	27,6	33,5	32,6	

Power supply cycle duration: 1200 seconds

Monitoring period following power supply: 600 seconds

Overall test observation period: 1800 seconds

Electrical input measurements

Oscilloscope

Ch1: V Capacitors

Ch2: I transformer

Ch3: V\_reactor

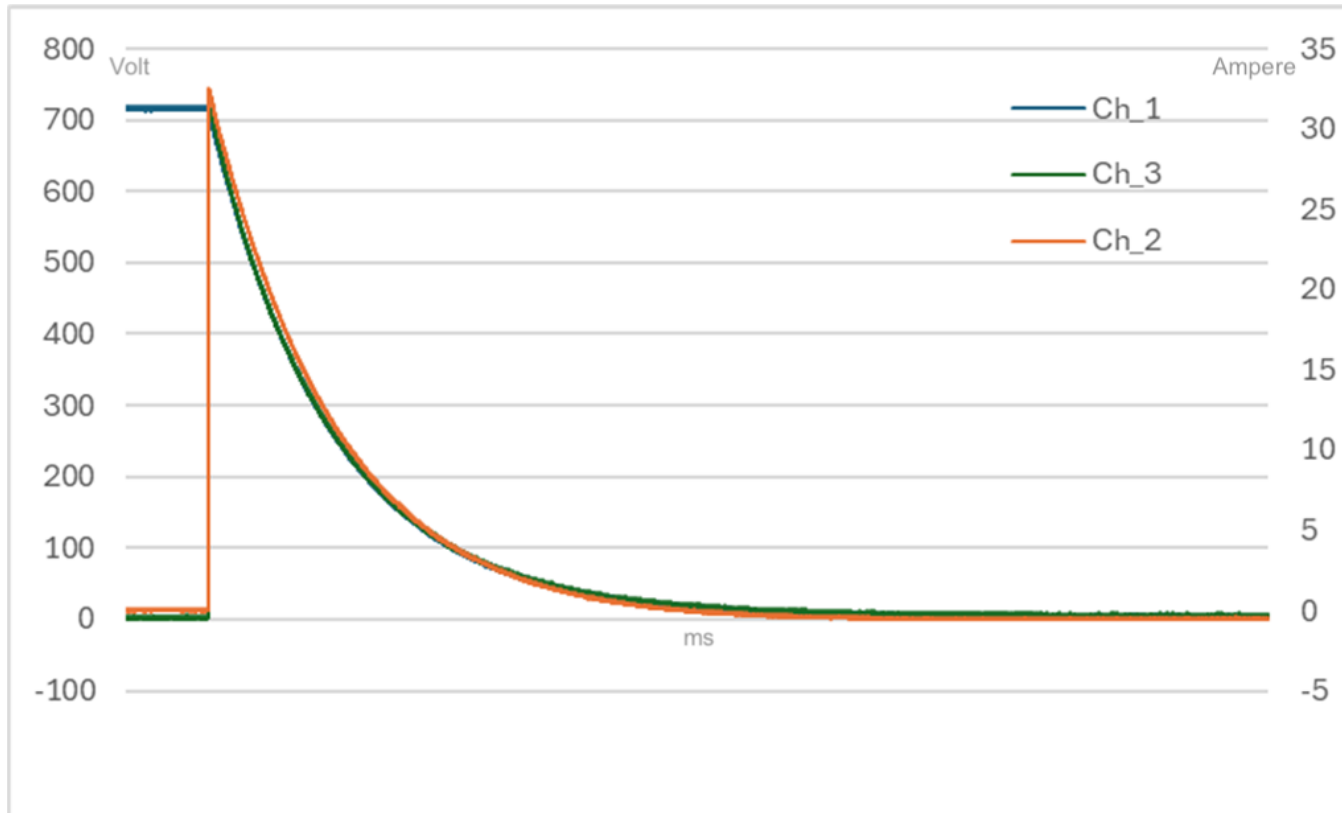
$F_1 = \int Ch_1 * Ch_2 dt$

$F_2 = \int Ch_2 * Ch_3 dt$

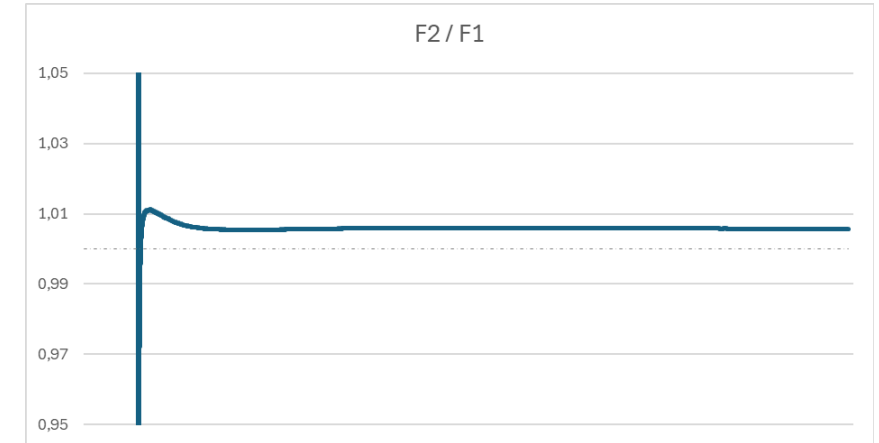


## 1.2 UM2.0 – Electrical measurement results

(1% NaHCO<sub>3</sub> solution, AISI 316L electrodes, 700 V power supply)



The integrals of the V (Ch1 and Ch3) and I (Ch2) curves over time calculate the energy supplied to the chamber.



F2-00-00100  
Last modification: May 21, 2025, 16:23

C1-00-00100  
Last modification: May 21, 2025, 16:23

C2-00-00100  
Last modification: May 21, 2025, 16:23

C3-00-00100  
Last modification: May 21, 2025, 16:23

F1-00-00100  
Last modification: May 21, 2025, 16:23

shot 00100

### Oscilloscope

Ch1: V Capacitors

Ch2: I transformer

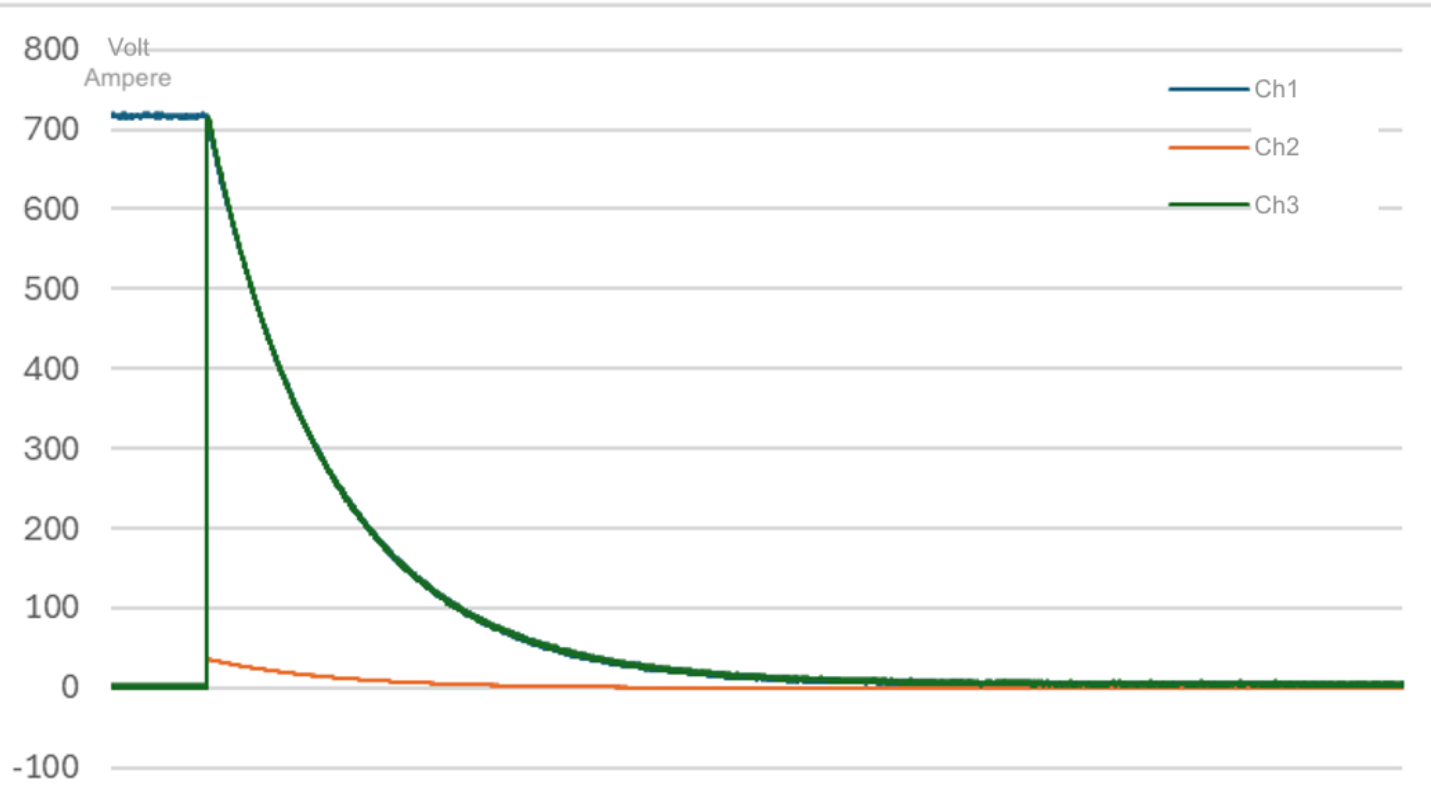
Ch3: V\_reactor

$$F_1 = \int Ch_1 * Ch_2 dt$$

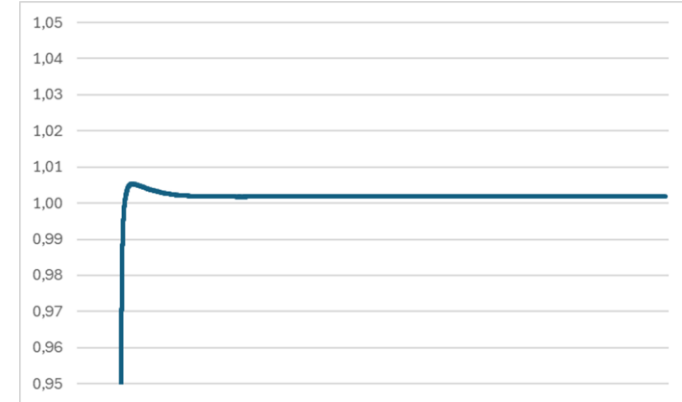
$$F_2 = \int Ch_2 * Ch_3 dt$$

## 1.2 UM2.0 – Electrical measurement results

(1% NaHCO<sub>3</sub> solution, AISI 316L electrodes, 700 V power supply)



The integrals of the V (Ch1 and Ch3) and I (Ch2) curves over time calculate the energy supplied to the chamber.



- C1-00-00500  
Last modification: May 21, 2025, 16:36
- C2-00-00500  
Last modification: May 21, 2025, 16:36
- C3-00-00500  
Last modification: May 21, 2025, 16:36
- F1-00-00500  
Last modification: May 21, 2025, 16:36
- F2-00-00500  
Last modification: May 21, 2025, 16:36

shot 00500

### Oscilloscope

Ch1: V Capacitors

Ch2: I transformer

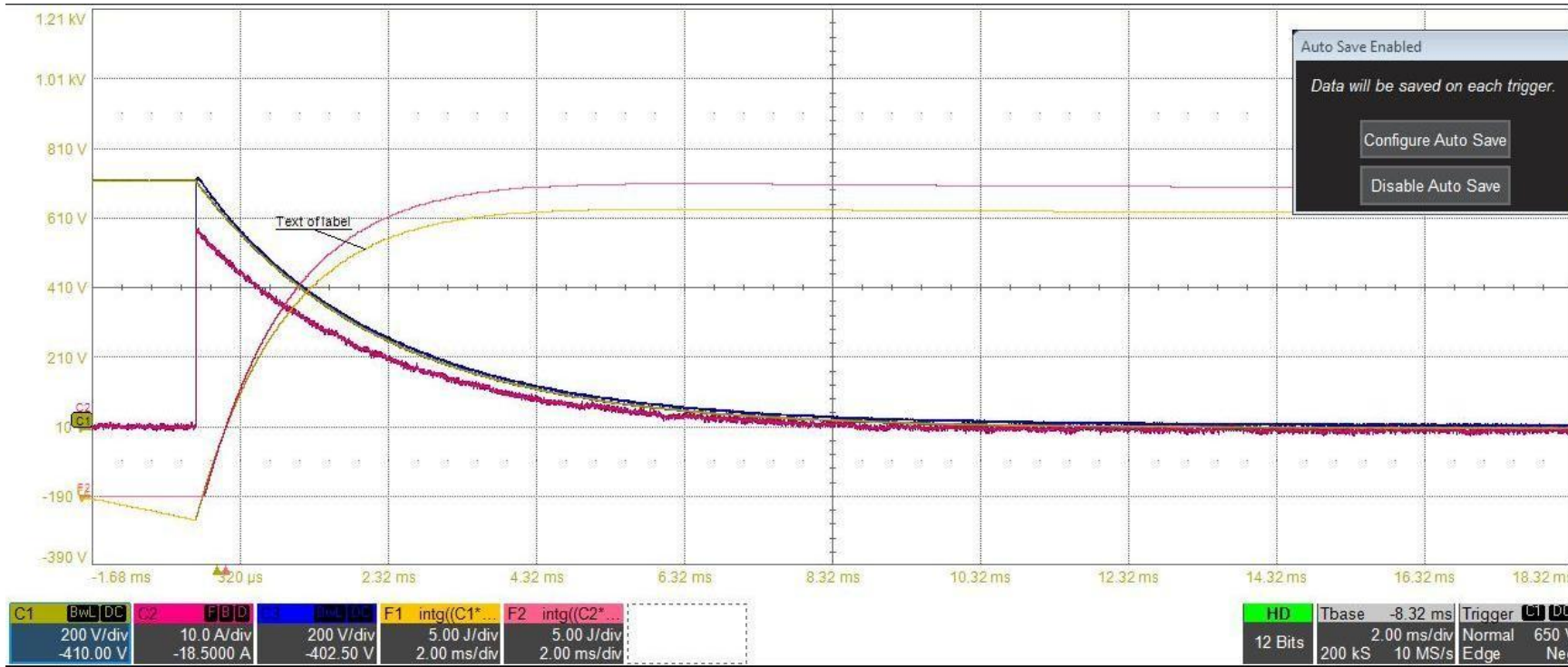
Ch3: V\_reactor

$$F_1 = \int Ch_1 * Ch_2 dt$$

$$F_2 = \int Ch_2 * Ch_3 dt$$

## 1.2 UM2.0 – Electrical measurement results

(1% NaHCO<sub>3</sub> solution, AISI 316L electrodes, 700 V power supply)

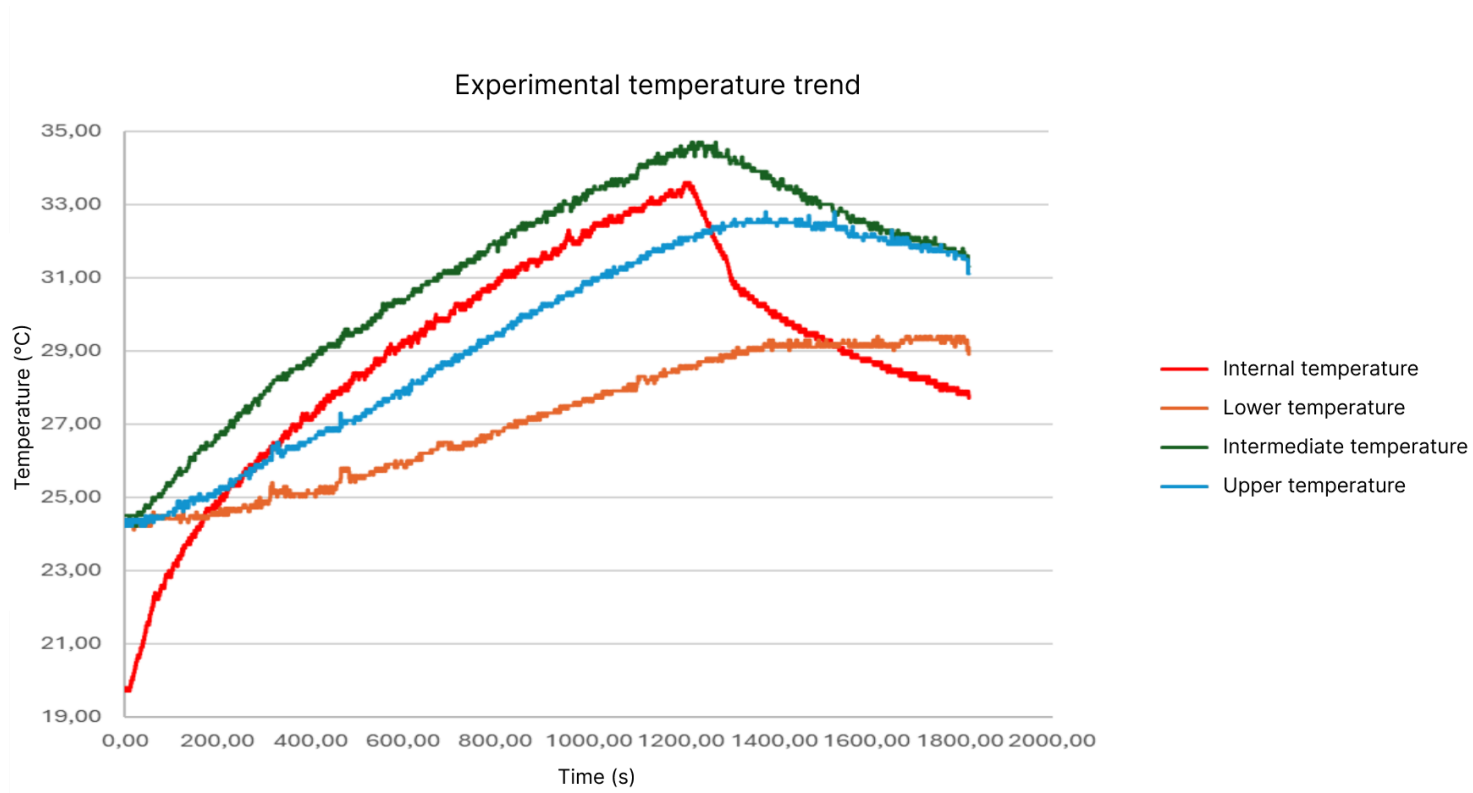


The integrals of the V (Ch1 and Ch3) and I (Ch2) curves over time calculate the energy supplied to the chamber.

**Oscilloscope**  
Ch1: V Capacitors Ch2: I transformer  
Ch3: V\_reactor  
 $F_1 = \int Ch_1 * Ch_2 dt$   
 $F_2 = \int Ch_2 * Ch_3 dt$

## 1.2 UM2.0 – Temperature results

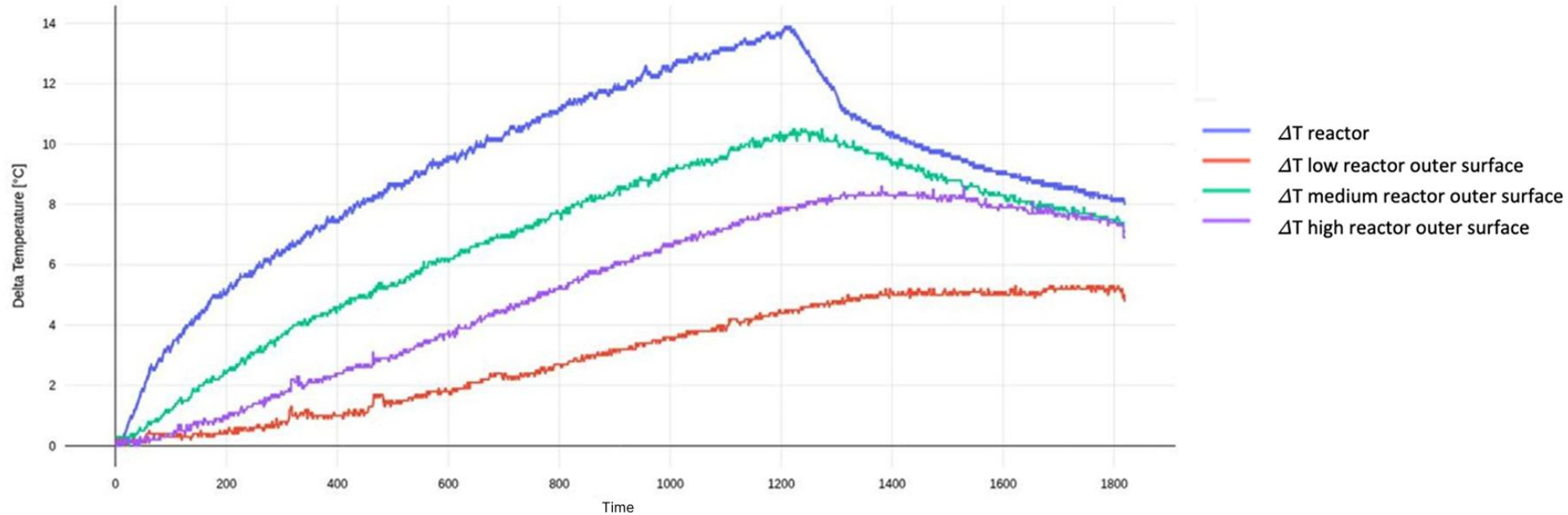
(1% NaHCO<sub>3</sub> solution, AISI 316L electrodes, 700 V power supply)





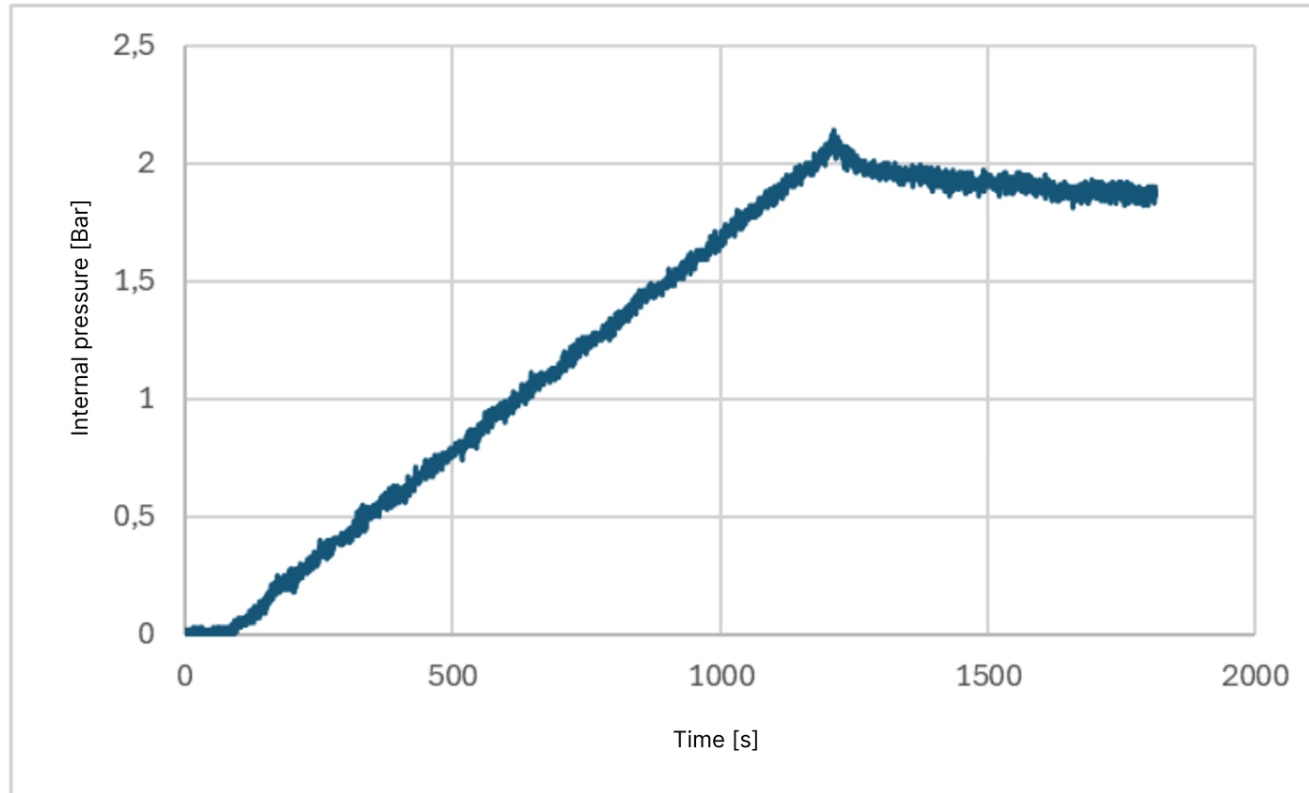
## 1.2 UM2.0 – Delta temperature

(1%  $\text{NaHCO}_3$  solution, AISI 316L electrodes, 700 V power supply)



## 1.2 UM2.0 – Pressure results

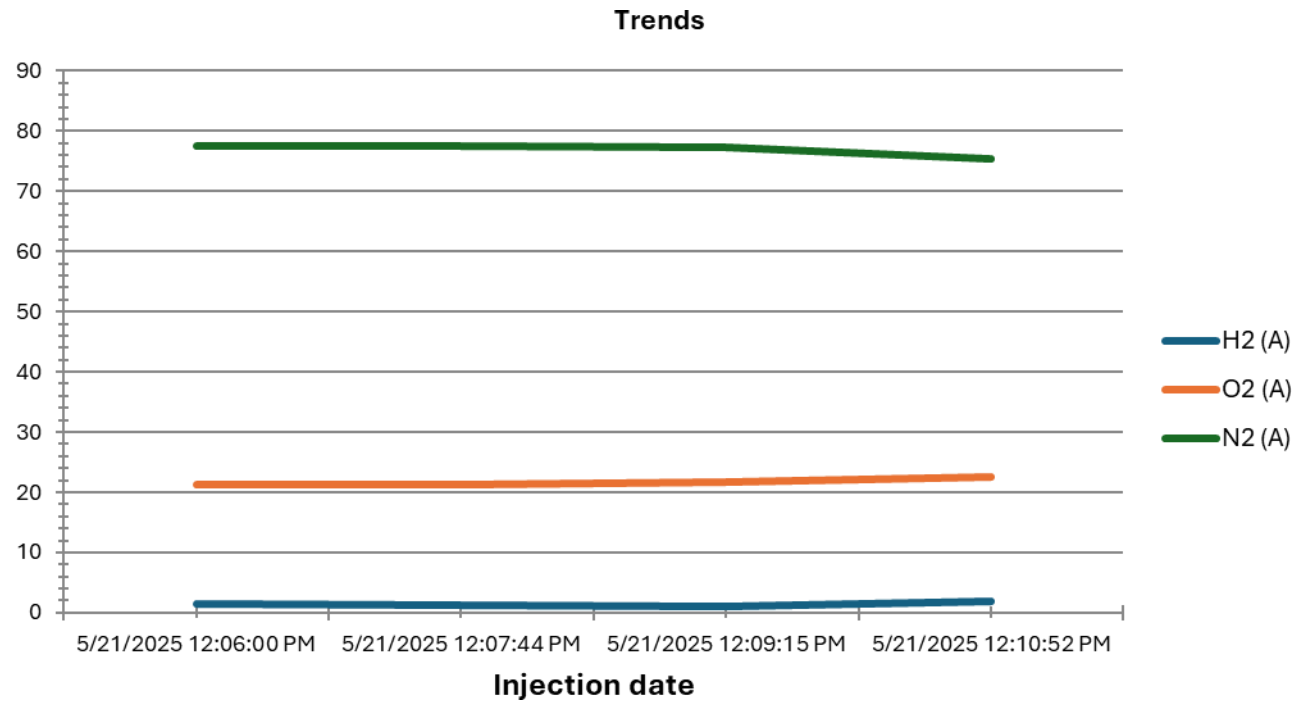
(1%  $\text{NaHCO}_3$  solution, AISI 316L electrodes, 700 V power supply)



The indicated pressure of the production of  $H_2$   
See test **2.2**

## 1.2 UM2.0 – Gas concentration result

(1% NaHCO<sub>3</sub> solution, AISI 316L electrodes, 700 V power supply)



See test 2.2

# 1.3 UM2.0

(1% NaCl solution, power supply with 2.25W resistor)

Summary of test conditions:

Conditions									
Voltage (V)	Electrode distance (mm)	Electrode Material	Electrode shape	Frequency (Hz)	Number of Shots	Solute	Solvent	Concentration	Reactor Version
2.25W(300V)	<b><u>Details available upon signing a non-disclosure agreement (NDA) – patent application pending</u></b>					NaCl	H <sub>2</sub> O	1%	2

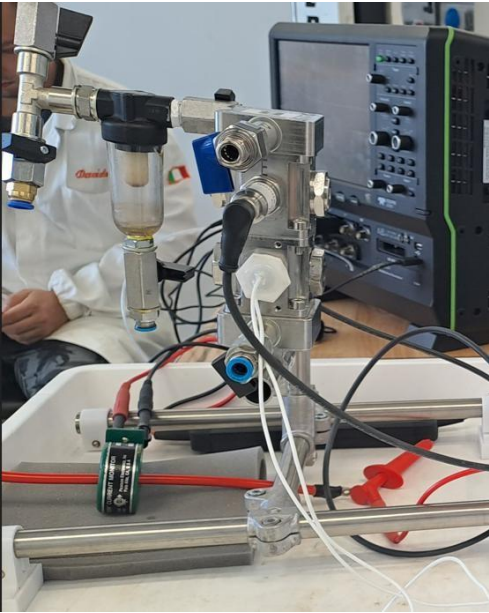
Quantities measured during the experiment							
Quantity	Acquired	Unit	Description	Initials	Intermezzo	Finals	Other
Ambient T	┐	°C	Ambient temperature	24.5	24.5	24.5	
Tr	┐	°C	Internal temperature	20.2	22.2	21.2	
Pr	┐	bar	Internal pressure	0	0	0	
T1	┐	°C	Lower surface temperature	24.5	25.2	24.9	
T2	┐	°C	Intermediate surface temperature	24.6	26.1	25.5	
T3	┐	°C	Upper surface temperature	24.7	26	25.6	

Replication of test 1.1 with energy supply with standard resistor.

*Power cycle duration: 1200 seconds*

*Monitoring period following power supply: 600 seconds*

*Overall test observation period: 1800 seconds*

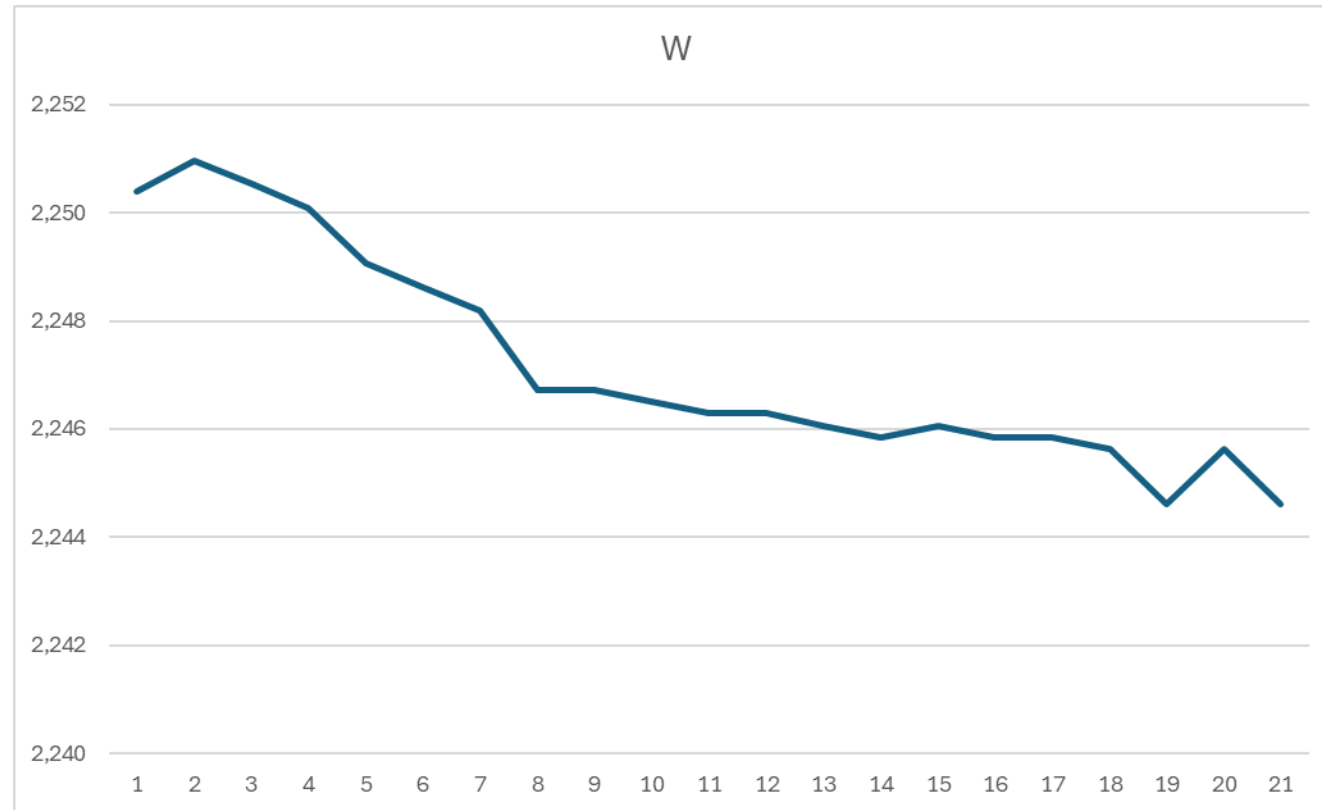




## 1.3 UM2.0 – Electrical measurement results

(1% NaCl solution, energy supplied by resistor; power supplied 2.25W)

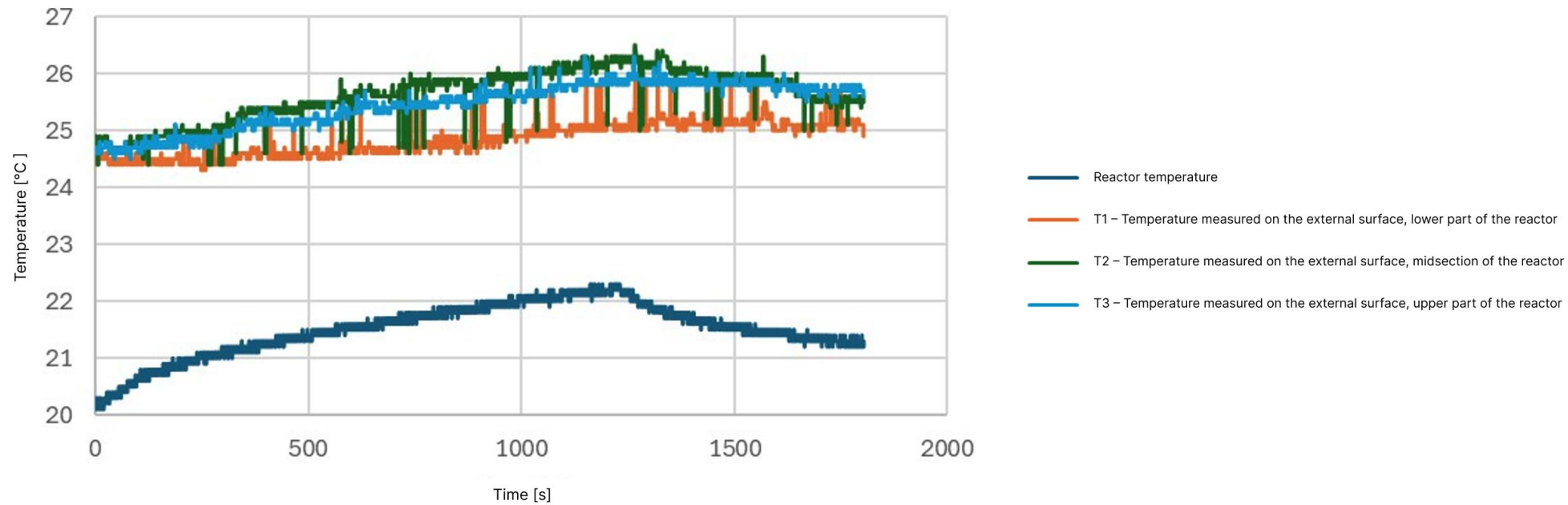
min	I	V	W
0	1.0192	2.208	2.250
1	1.019	2.209	2.251
2	1.0188	2.209	2.251
3	1.0186	2.209	2.250
4	1.0186	2.208	2.249
5	1.0184	2.208	2.249
6	1.0182	2.208	2.248
7	1.018	2.207	2.247
8	1.018	2,207	2,247
9	1.0179	2.207	2.247
10	1.0178	2.207	2.246
11	1.0178	2.207	2.246
12	1.0177	2.207	2.246
13	1.0176	2.207	2.246
14	1.0177	2.207	2.246
15	1.0176	2.207	2.246
16	1.0176	2.207	2.246
17	1.0175	2.207	2.246
18	1.0175	2.206	2.245
19	1.0175	2.207	2.246
20	1.0175	2.206	2.245



Voltage and current were measured using a multimeter

## 1.3 UM2.0 – Temperature results

(1% NaCl solution, energy supplied by resistor; power supplied 2.25W)





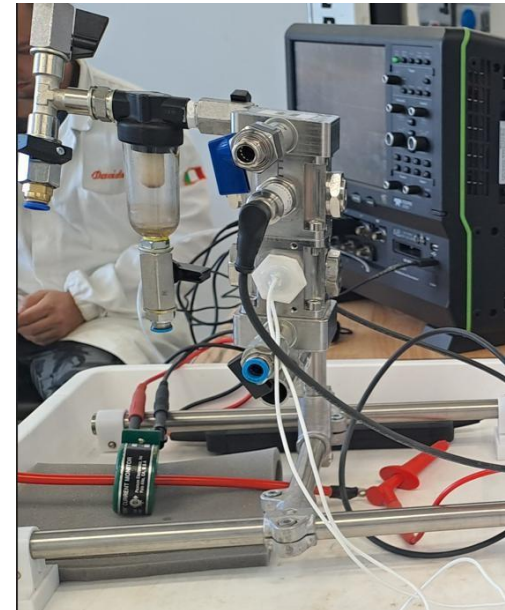
## 1.4 UM2.0

(1% NaHCO<sub>3</sub> solution, energy supplied by resistor; power supplied 12.25W)

Summary of test conditions:

Conditions									
Voltage (V)	Electrode distance (mm)	Electrode material	Electrode shape	Frequency (Hz)	Number of shots	Solute	Solvent	Concentration	Reactor Version
2.25W(300V)	<u>Details available upon signing a non-disclosure agreement (NDA) – patent application pending</u>					NaHCO <sub>3</sub>	H <sub>2</sub> O	1%	2

Quantities measured during the experiment							
Quantity	Acquired	Unit	Description	Initials	Intermediate	Finals	Other
Ambient T	┐	°C	Ambient temperature	24.5	24.5	24.5	
Tr	┐	°C	Internal temperature	22.7	32.5	27.5	
Pr	┐	bar	Internal pressure	0	0	0	
T1	┐	°C	Lower surface temperature	24.7	28.1	28.5	
T2	┐	°C	Intermediate surface temperature	25.8	34.1	30.7	
T3	┐	°C	Upper surface temperature	25	32.1	31.1	



Replication of test 1.2 with standard resistor power supply.

*Power cycle duration: 1200 seconds*

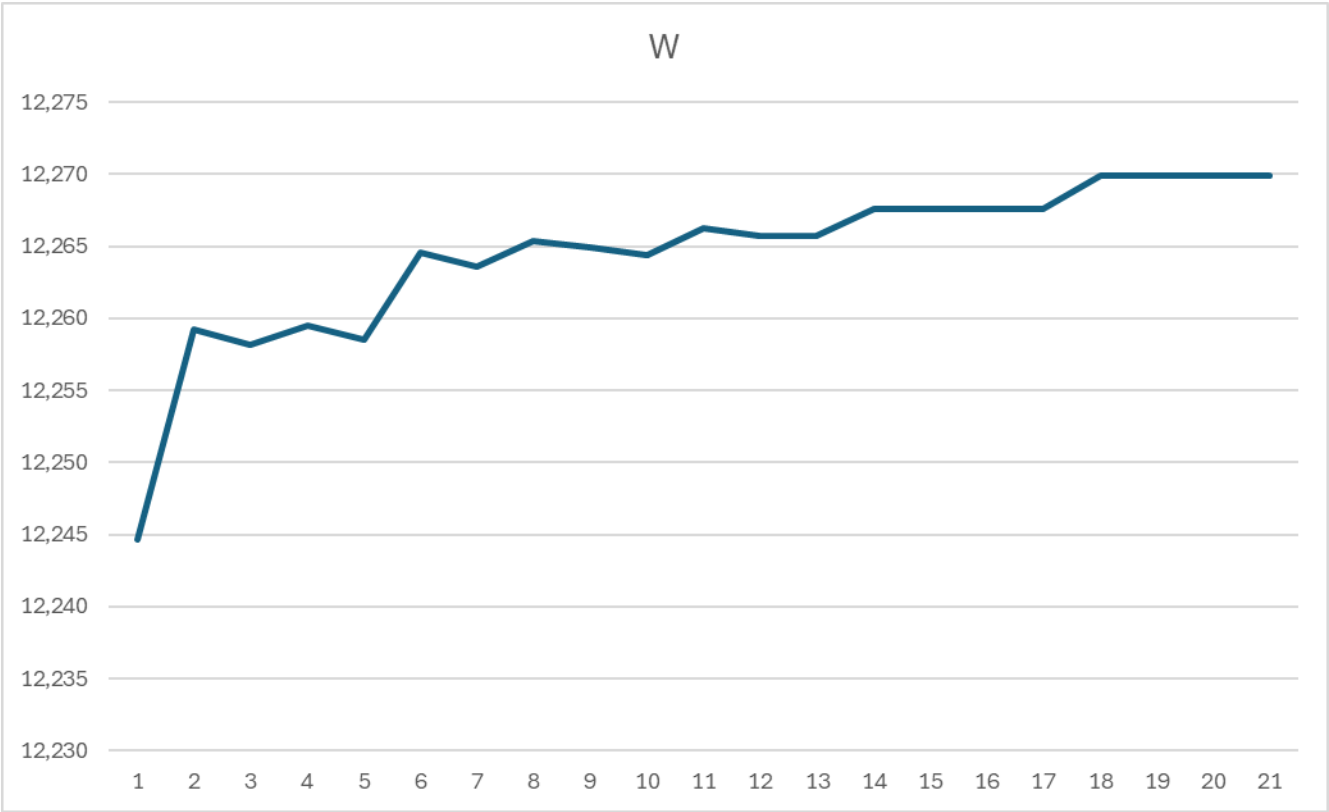
*Monitoring period following power supply: 600 seconds*

*Overall test observation period: 1800 seconds*

# 1.4 UM2.0 – Electrical measurement results

(1% NaHCO3 solution, energy supplied by resistor; power supplied 12.25W)

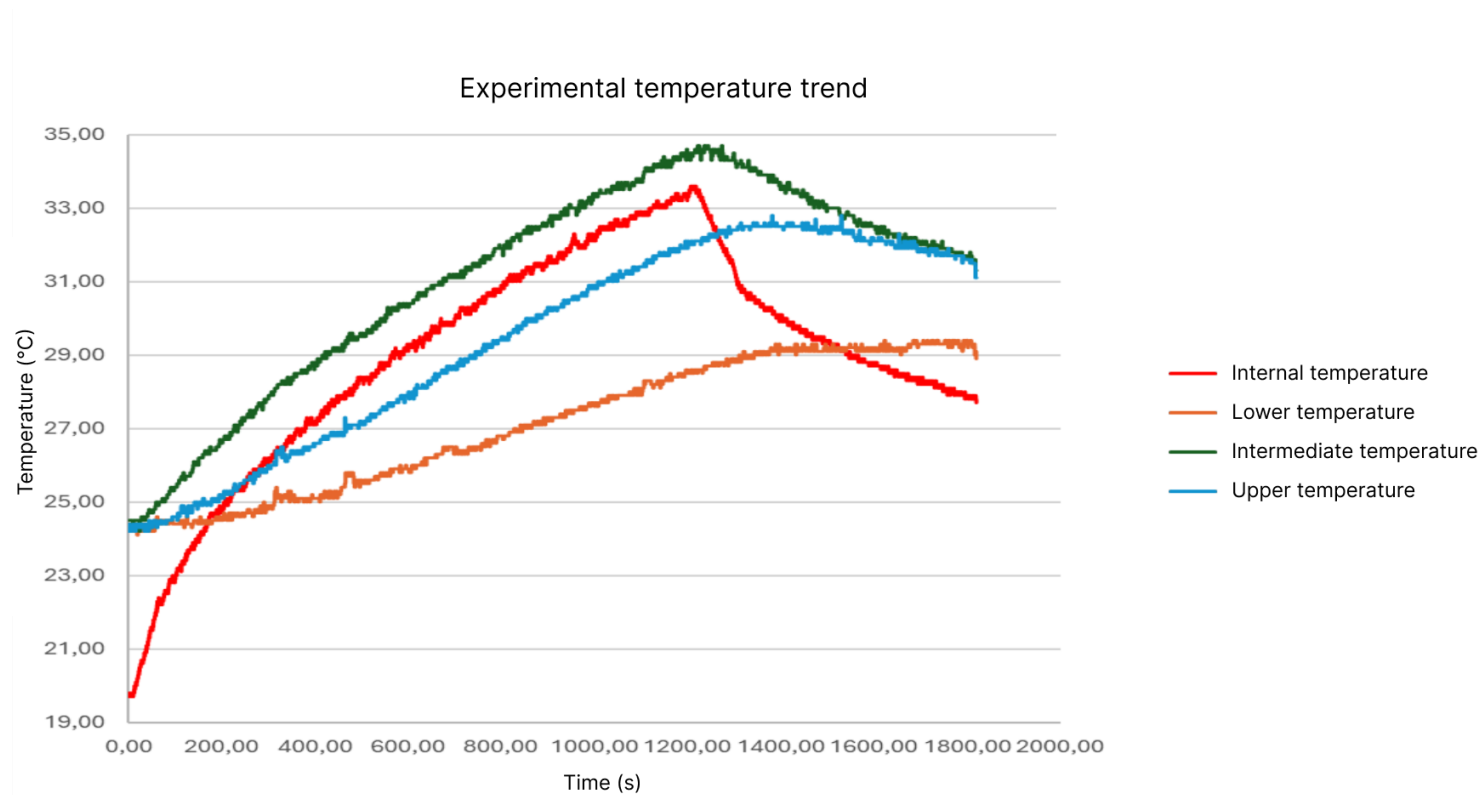
min	I	V	W
0	2.373	5.16	12.245
1	2.3726	5.167	12.259
2	2.3724	5.167	12.258
3	2.3722	5.168	12,260
4	2.372	5.168	12,258
5	2.3718	5,171	12.265
6	2.3716	5.171	12.264
7	2.3715	5.172	12.265
8	2.3714	5.172	12.265
9	2.3713	5.172	12,264
10	2.3712	5.173	12,266
11	2.3711	5.173	12,266
12	2.3711	5.173	12,266
13	2.371	5.174	12,268
14	2,371	5,174	12,268
15	2,371	5,174	12,268
16	2,371	5,174	12,268
17	2,371	5,175	12,270
18	2,371	5,175	12,270
19	2,371	5,175	12,270
20	2,371	5,175	12,270



Voltage and current were measured using a multimeter

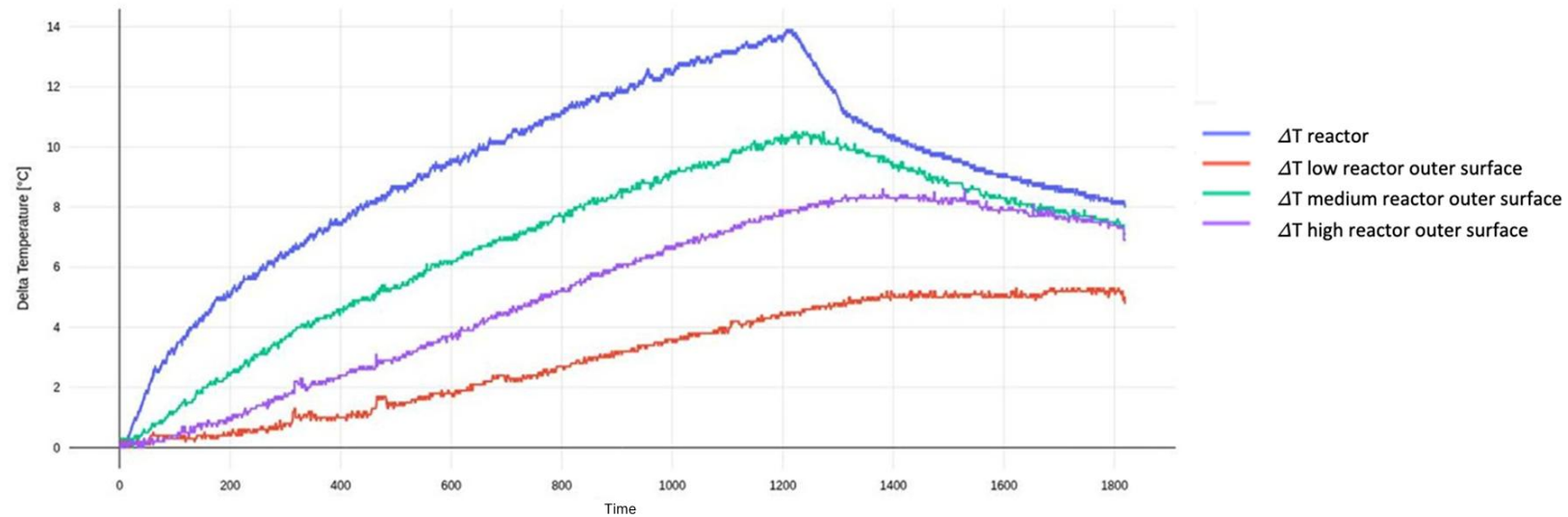
## 1.4 UM2.0 – Temperature results

(1% NaHCO<sub>3</sub> solution, energy supplied by resistor; power supplied 12.25W)



## 1.4 UM2.0 – Delta temperature

(1% NaHCO<sub>3</sub> solution, energy supplied by resistor; power supplied 12.25W)

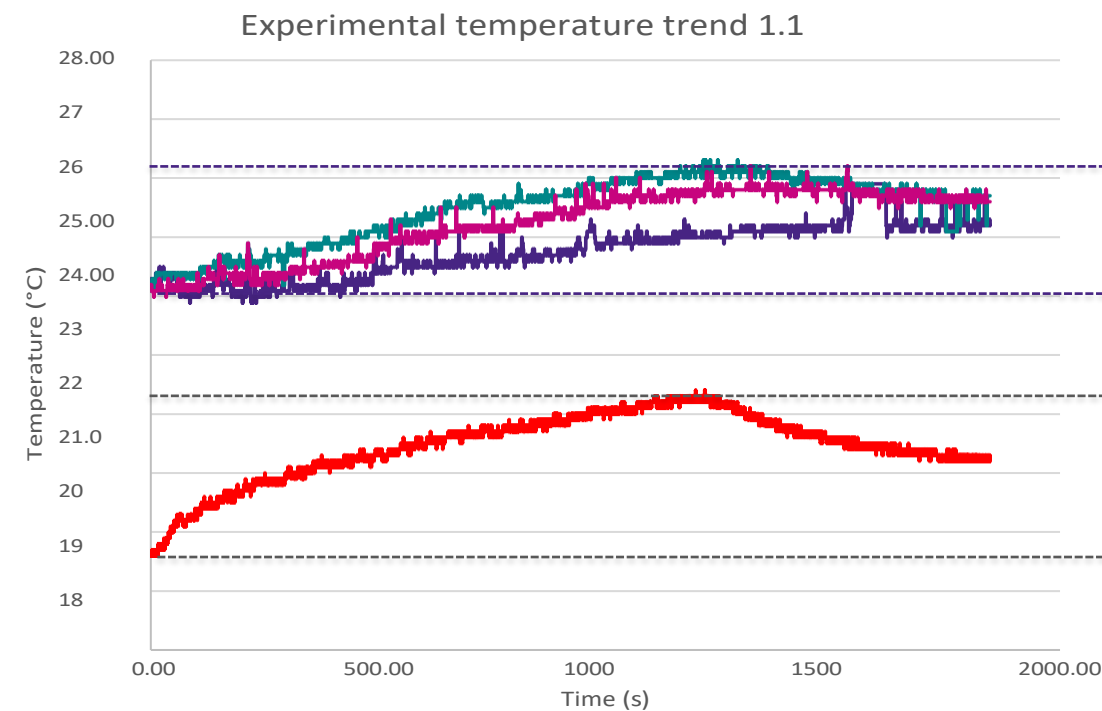




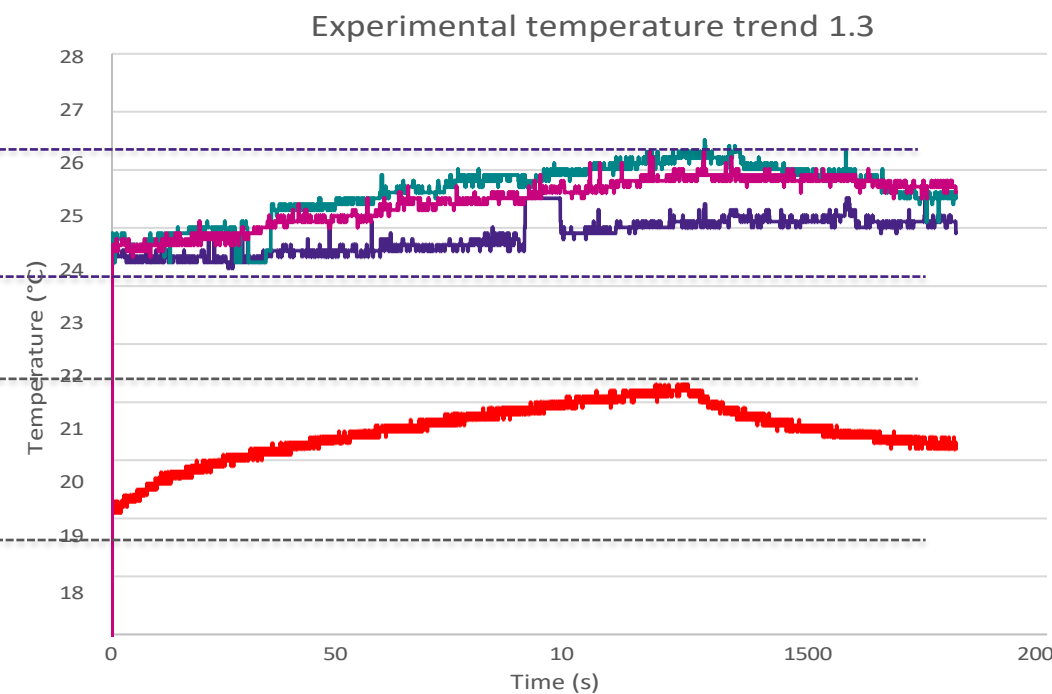
# 1.1 vs 1.3 UM 2.0 - Temperatures

(1% NaCl solution, power supply 300V or equiv. power 2.25W)

UM 2.0



Resistor



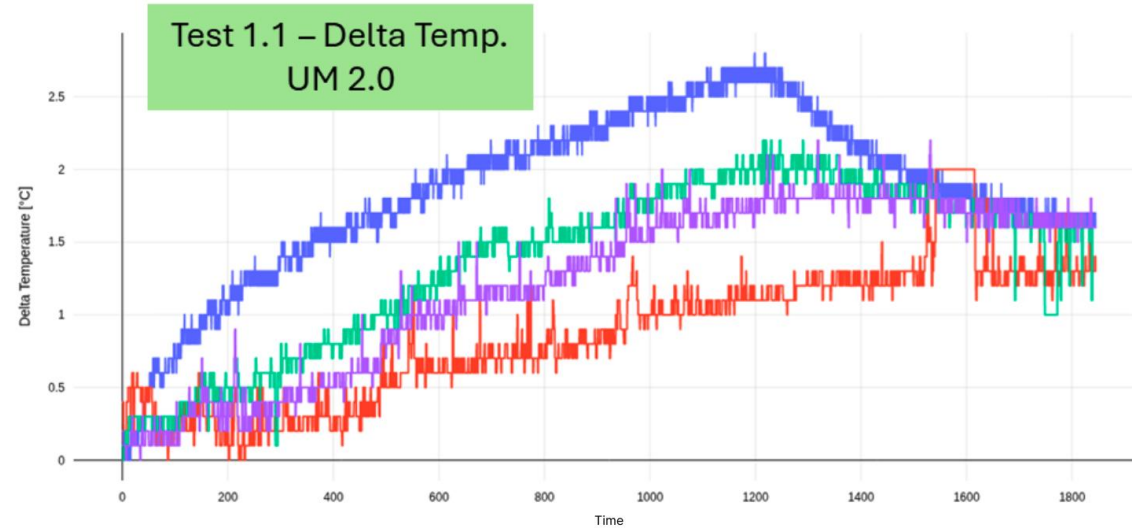
The temperature trends show different values and ranges between the two power supplies.

- Internal temperature
- Lower temperature
- Intermediate temperature
- Upper temperature

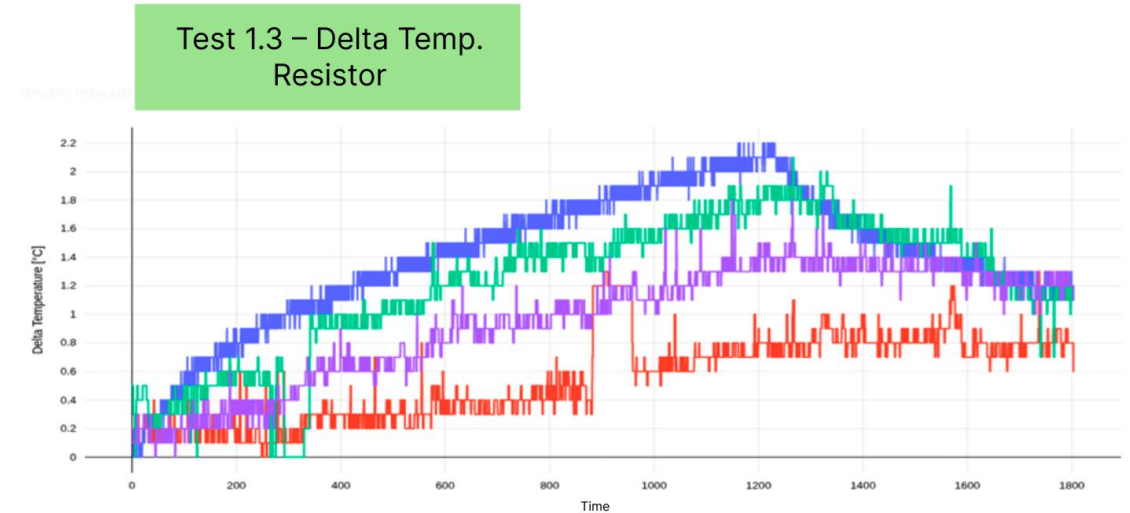
# 1.1 vs 1.3 – Delta temperature

(1% NaCl solution, 300V power supply or equivalent power 2.25W)

Applied interactive data 2025-05-28



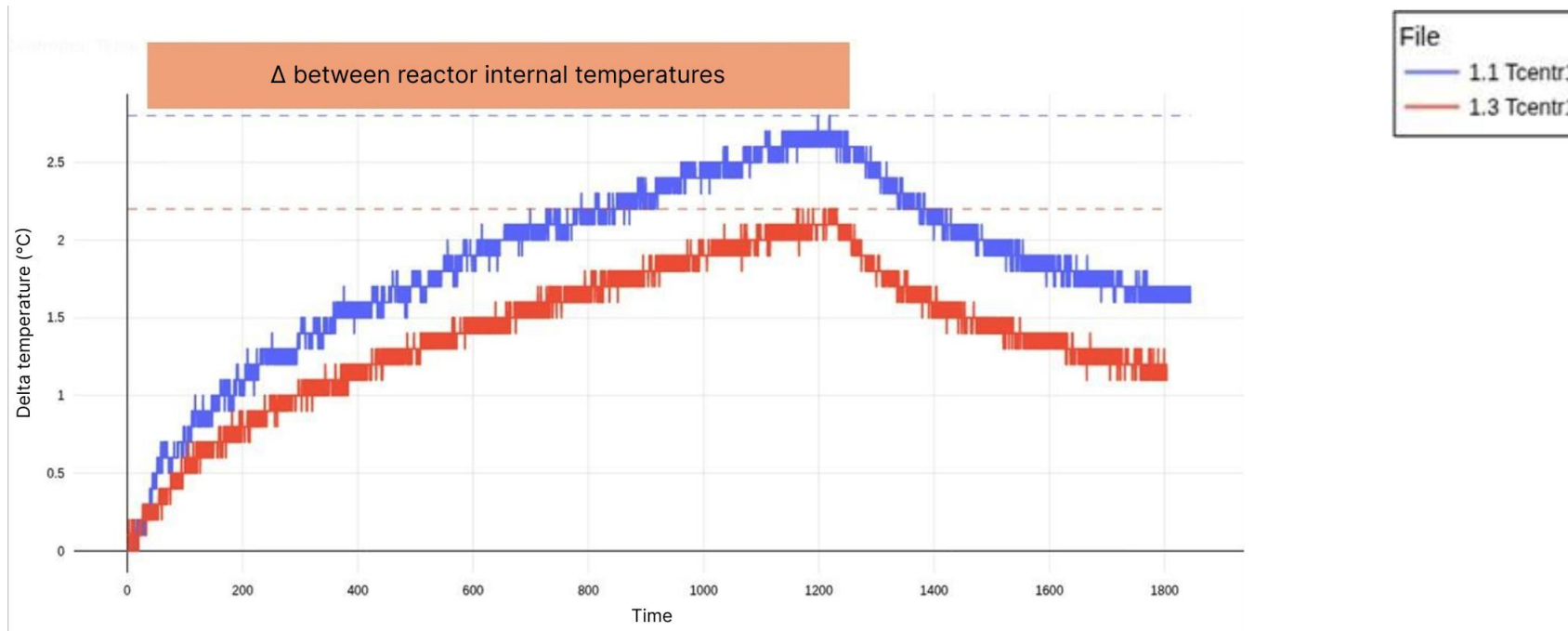
Applied interactive data 2025-05-28



As can be seen, the UM.0 system achieves delta temperatures higher than those achieved with the resistor power supply at the same power level.

# 1.1 vs 1.3 – Delta temperature

(1% NaCl solution, 300V power supply or equiv. power 2.25W)

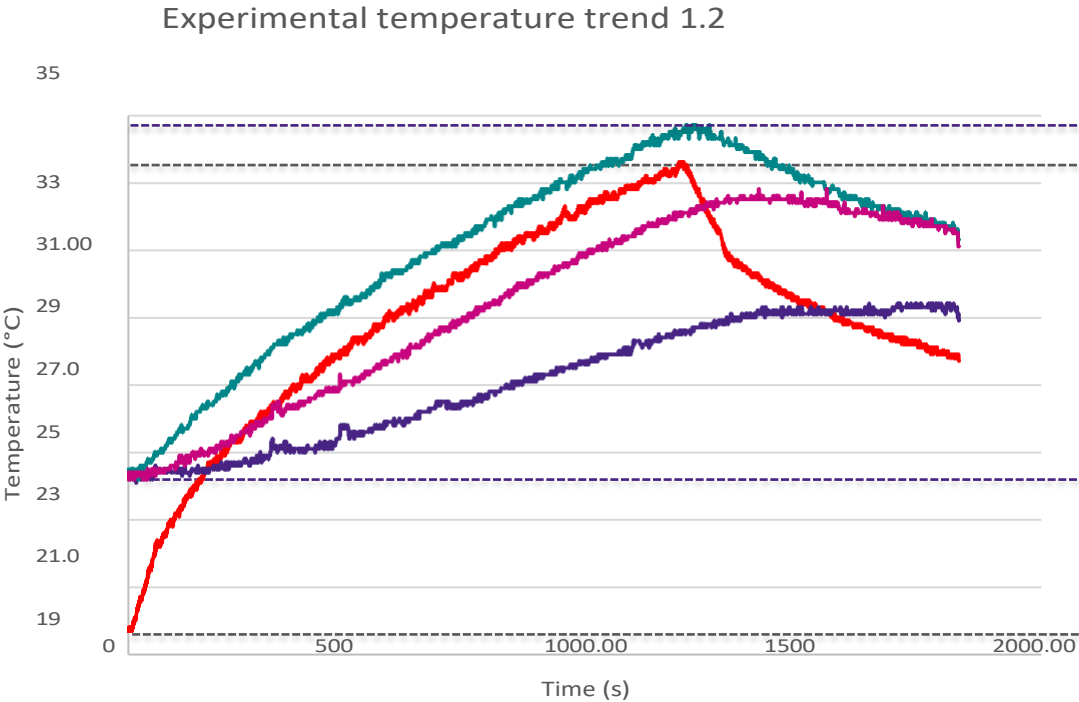


The temperature trends show different values and ranges between the two power supplies

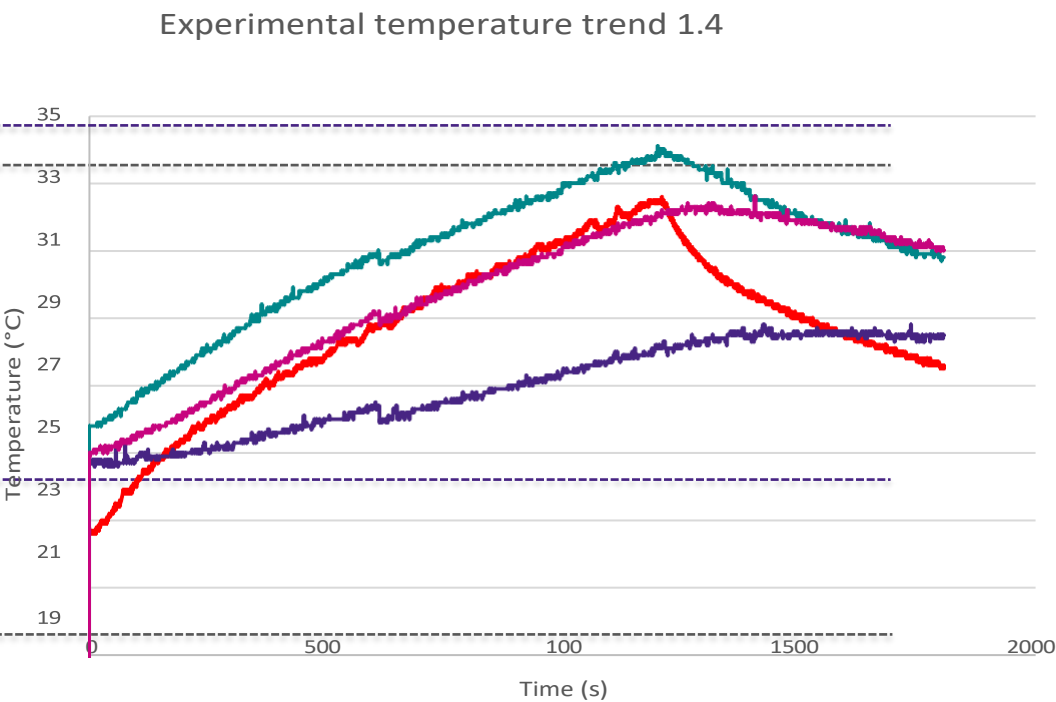
# 1.2 vs 1.4 UM 2.0 - Temperatures

(1% NaHCO3 solution, 700V power supply or equivalent power 12.25W)

UM 2.0



Resistor

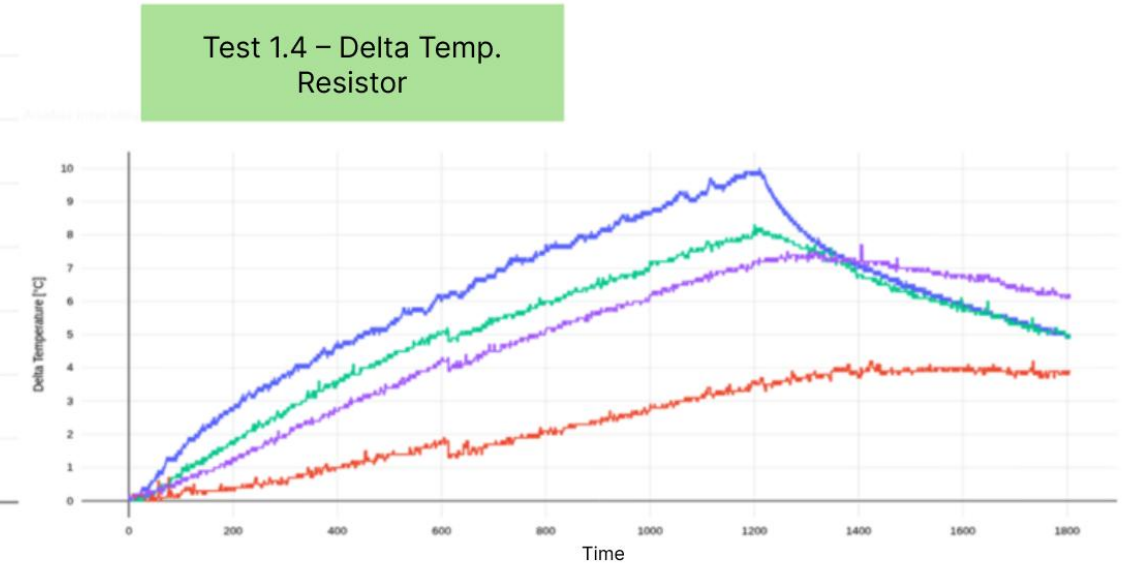
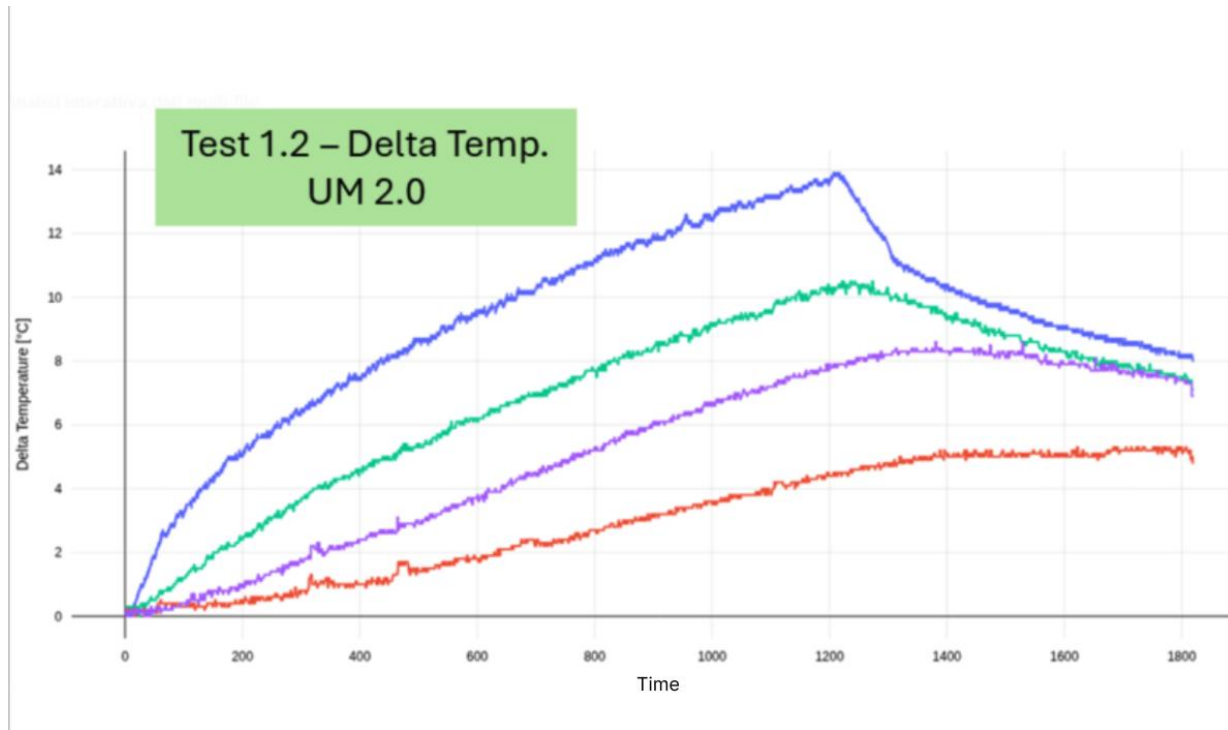


The temperature trends show different values and ranges between the two power supplies.

- Internal temperature
- Lower temperature
- Intermediate temperature
- Upper temperature

# 1.2 vs 1.4 UM 2.0 - Delta temperature

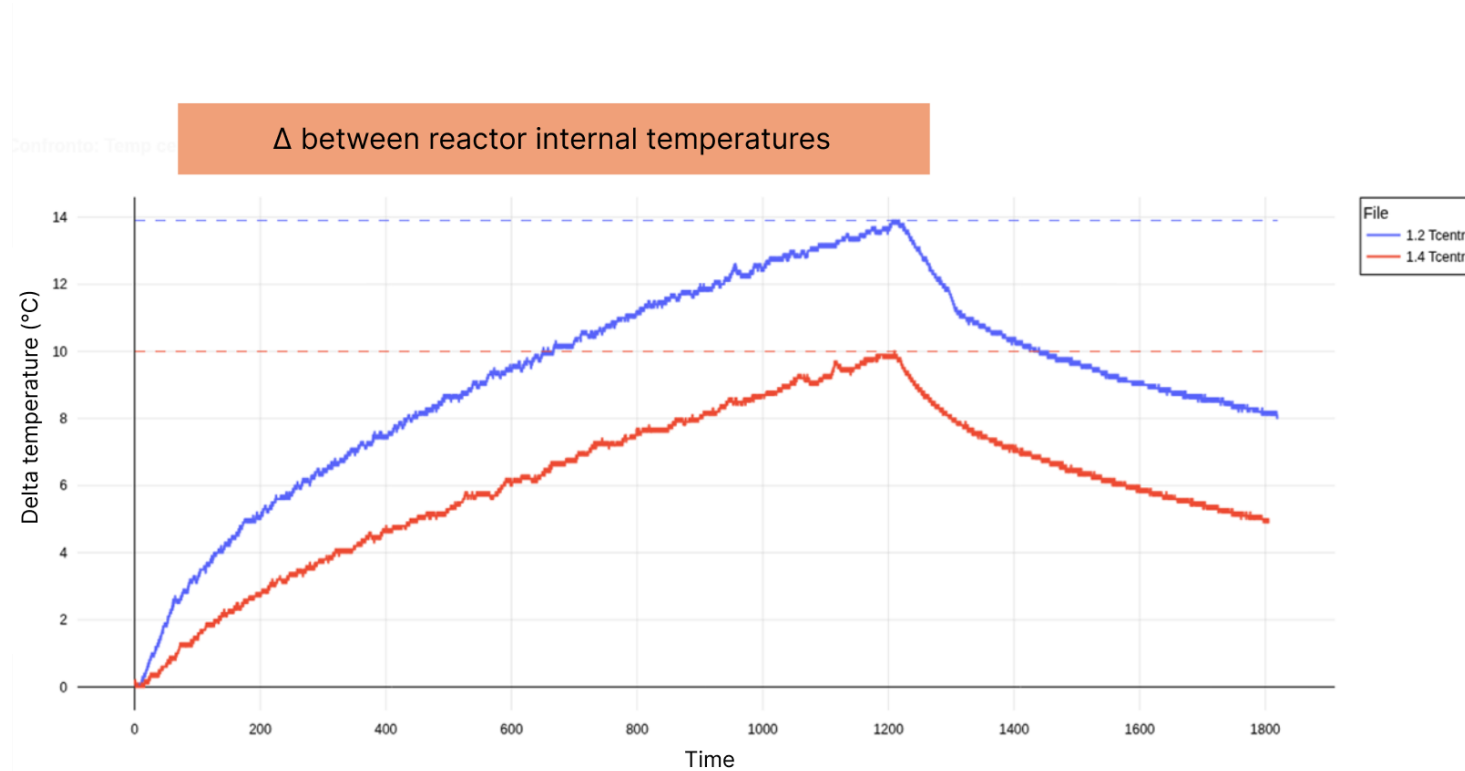
(1% NaHCO<sub>3</sub> solution, power supply 700V or equiv. pot. 12.25W)



The temperature trends show different values and ranges between the two power supplies

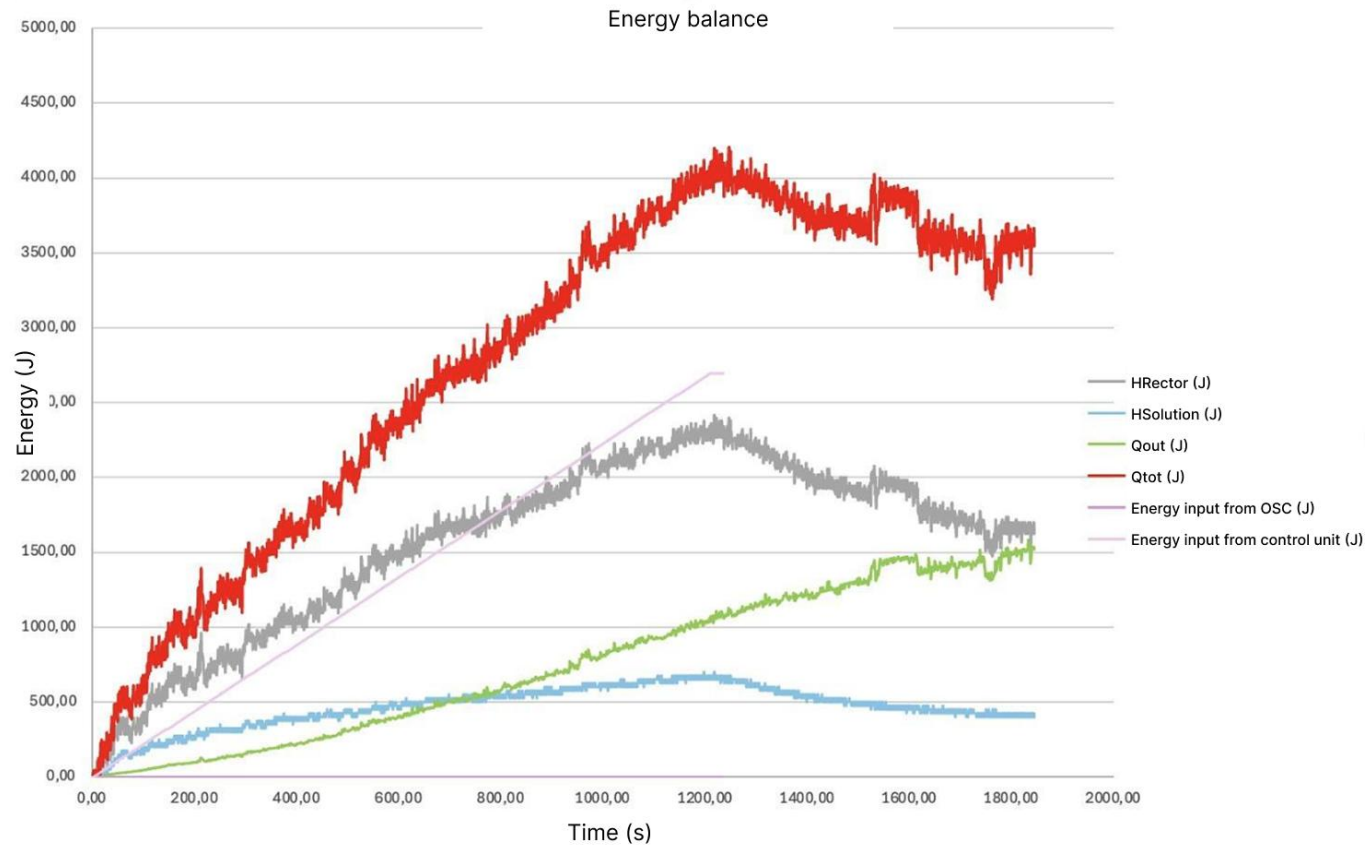
# 1.2 vs 1.4 UM 2.0 - Delta temperature

(1% NaHCO<sub>3</sub> solution, power supply 700V or equiv. pot. 12.25W)



The temperature trends show different values and ranges between the two power supplies

# 1.1 UM 2.0 Energy balance



The energy input was calculated based on the capacity of the power supply capacitors

$$E = \frac{1}{2} CV^2$$

Where C=100μF and V=300V

- **Red**: represents the sum curve of accumulated and dissipated heat
- **Grey**: represents the heat accumulated by the reactor
- **Blue**: represents the heat accumulated by the solution
- **Green**: represents the heat dissipated into the environment
- **Pink**: represents the energy input from the capacitors

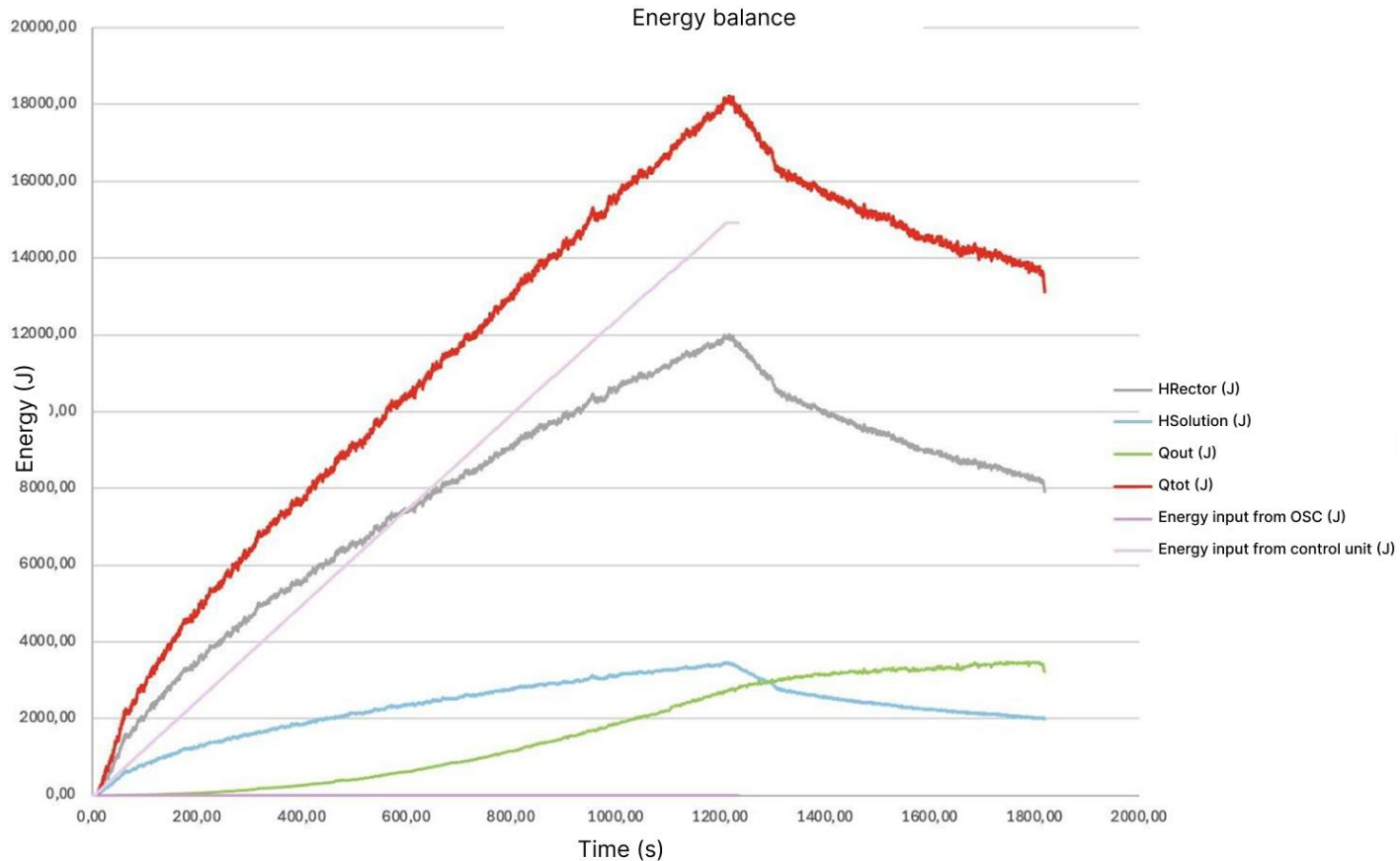
## Observations:

- The graph shows an energy surplus in heat
- Calculation performed according to the model proposed by Prometheus

The legend shows:



## 1.2 UM 2.0 Energy balance



The energy input was calculated based on the capacity of the power supply capacitors

$$E = \frac{1}{2} CV^2$$

Where  $C=100\mu\text{F}$  and  $V=700\text{V}$

The legend shows:

- **Red:** represents the sum curve of accumulated and dissipated heat
- **Grey:** represents the heat accumulated by the reactor
- **Blue:** represents the heat accumulated by the solution
- **Green:** represents the heat dissipated into the environment
- **Pink:** represents the energy input from the capacitors

Observations:

- The graph shows an energy surplus in heat
- Calculation performed according to the model proposed by Prometheus

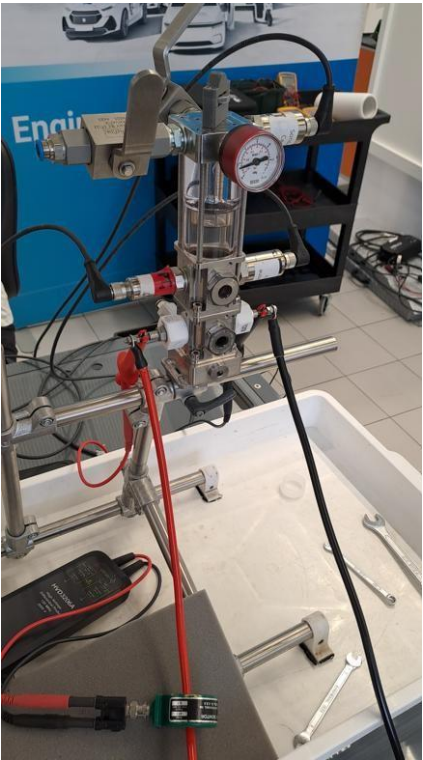
# 2.2 UM 2.0 production $H_2$

(1% NaCl solution, AISI 316L electrodes, 1000V power supply)

Summary of test conditions:

Conditions									
Voltage (V)	Electrode distance (mm)	Electrode material	Electrode shape	Frequency (Hz)	Number of Shots	Solute	Solvent	Concentration	Reactor Version
1000	<i>Details available upon signing a non-disclosure agreement (NDA) – patent application pending</i>					NaCl	H <sub>2</sub> O	1%	2.4

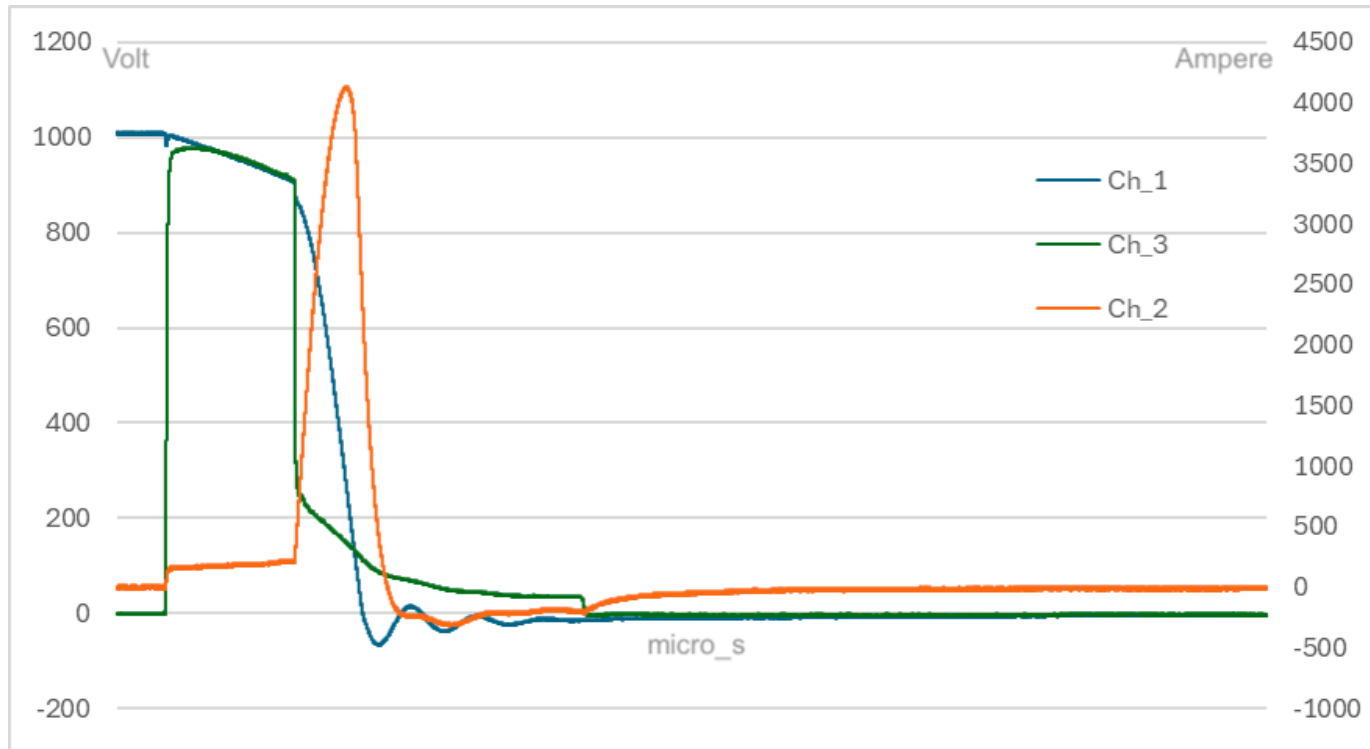
Quantities measured during the experiment							
Quantity	Acquired	Unit	Description	Initials	Intermezzo	Finals	Other
Ambient T	<input type="checkbox"/>	°C	Ambient temperature				
Tr	<input type="checkbox"/>	°C	Internal temperature	20.6	37.9	33.5	
Pr	<input type="checkbox"/>	bar	Internal pressure	0	1.99	0.32	
Pacc	<input type="checkbox"/>	bar	Upper chamber vacuum pressure	-0.95	-0.93	0.19	
T1	<input type="checkbox"/>	°C	Lower surface temperature	25	38.2	26.1	
T2	<input type="checkbox"/>	°C	Intermediate surface temperature	25.1	40.1	36.1	
T3	<input type="checkbox"/>	°C	Upper body surface temperature	25.1	38.2	36.1	
T4	<input type="checkbox"/>	°	Measured upper surface temperature	24.7	26.5	36.1	



The reaction chamber was brought to a negative pressure relative to atmospheric pressure to remove air.

## 2.2 UM 2.0 – Electrical measurement results

(1% NaCl solution, AISI 316L electrodes, 1000V power supply)



C1-00-00100  
Last modified: May 22, 2025, 10:00

C2-00-00100  
Last modified: May 22, 2025, 10:00

C3-00-00100  
Last modified: May 22, 2025, 10:00

F1-00-00100  
Last modified: May 22, 2025, 10:00

F2-00-00100  
Last modified: May 22, 2025, 10:00

shot 00100

### Oscilloscope

Ch1: V Capacitors  
Ch2: I transformer  
Ch3: V\_reactor

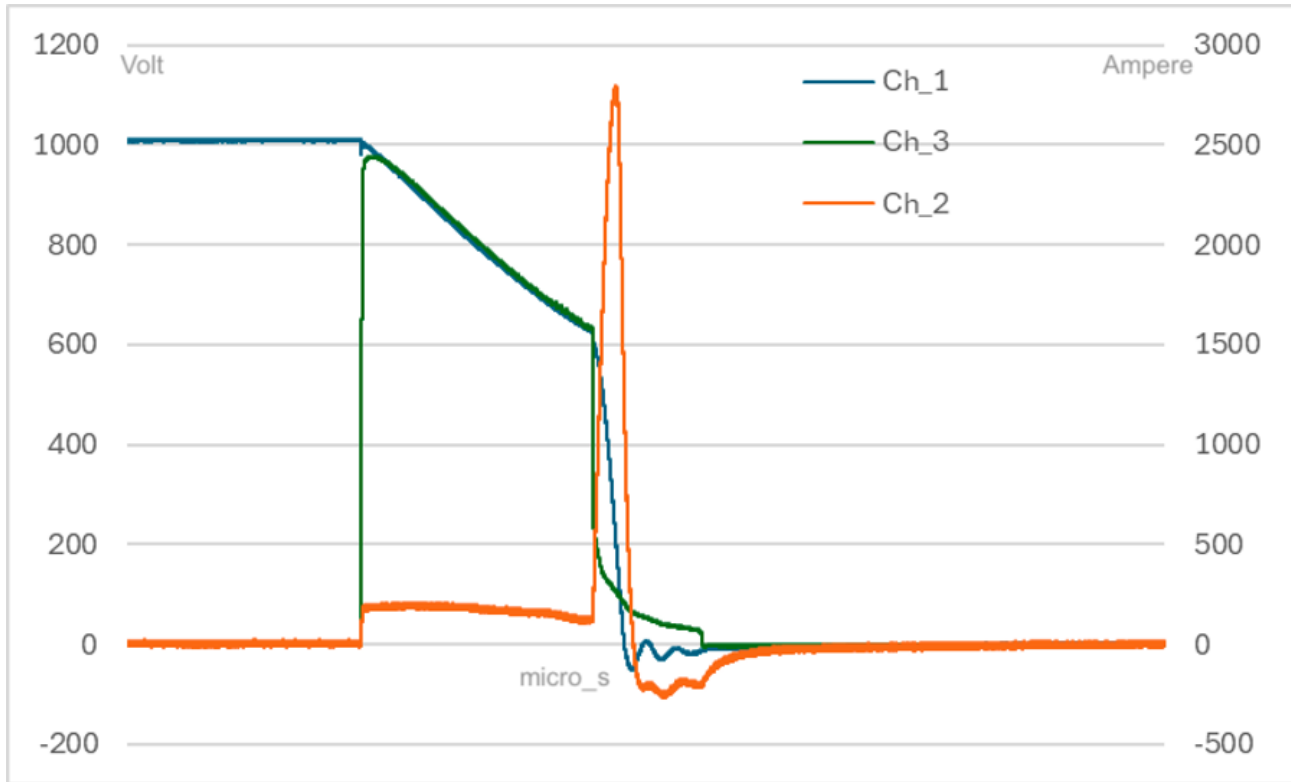
$$F_1 = \int Ch_1 * Ch_2 dt$$

$$F_2 = \int Ch_2 * Ch_3 dt$$

The integrals of the V (Ch1 and Ch3) and I (Ch2) curves over time calculate the energy supplied to the chamber.

## 2.2 UM 2.0 – Electrical measurement results

(1% NaCl solution, AISI 316L electrodes, 1000V power supply)



F1: - 00-00400  
Last modified: May 22, 2025 10:10

F2: - 00-00400  
Last modified: May 22, 2025 10:10

C1: - 00-00400  
Last modified: May 22, 2025 10:10

C2: - 00-00400  
Last modified: May 22, 2025 10:10

C3: - 00-00400  
Last modified: May 22, 2025 10:10

shot 00400

### Oscilloscope

Ch1: V Capacitors

Ch2: I transformer

Ch3: V\_reactor

$$F_1 = \int Ch_1 * Ch_2 dt$$

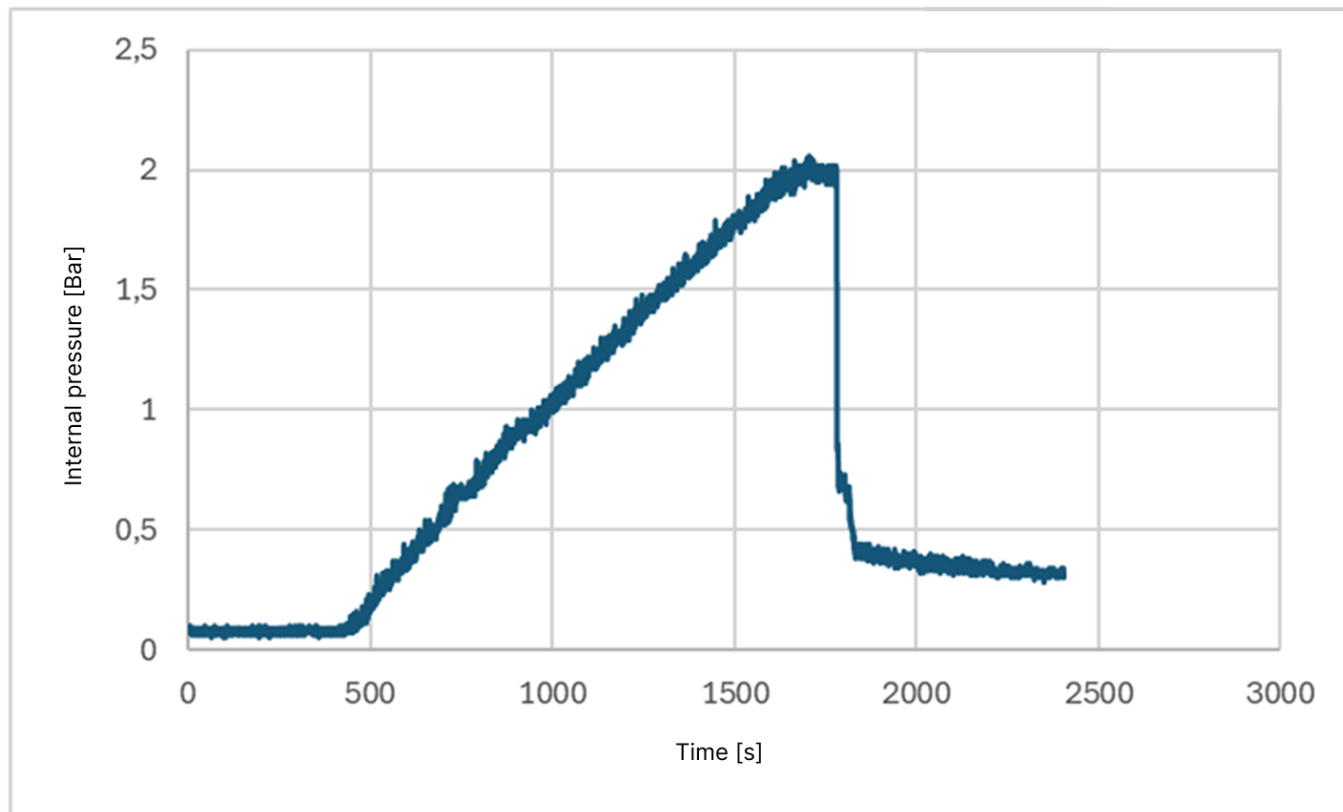
$$F_2 = \int Ch_2 * Ch_3 dt$$

The integrals of the V (Ch1 and Ch3) and I (Ch2) curves over time calculate the energy supplied to the chamber.

## 2.2 UM 2.0 production $H_2$ - pressure

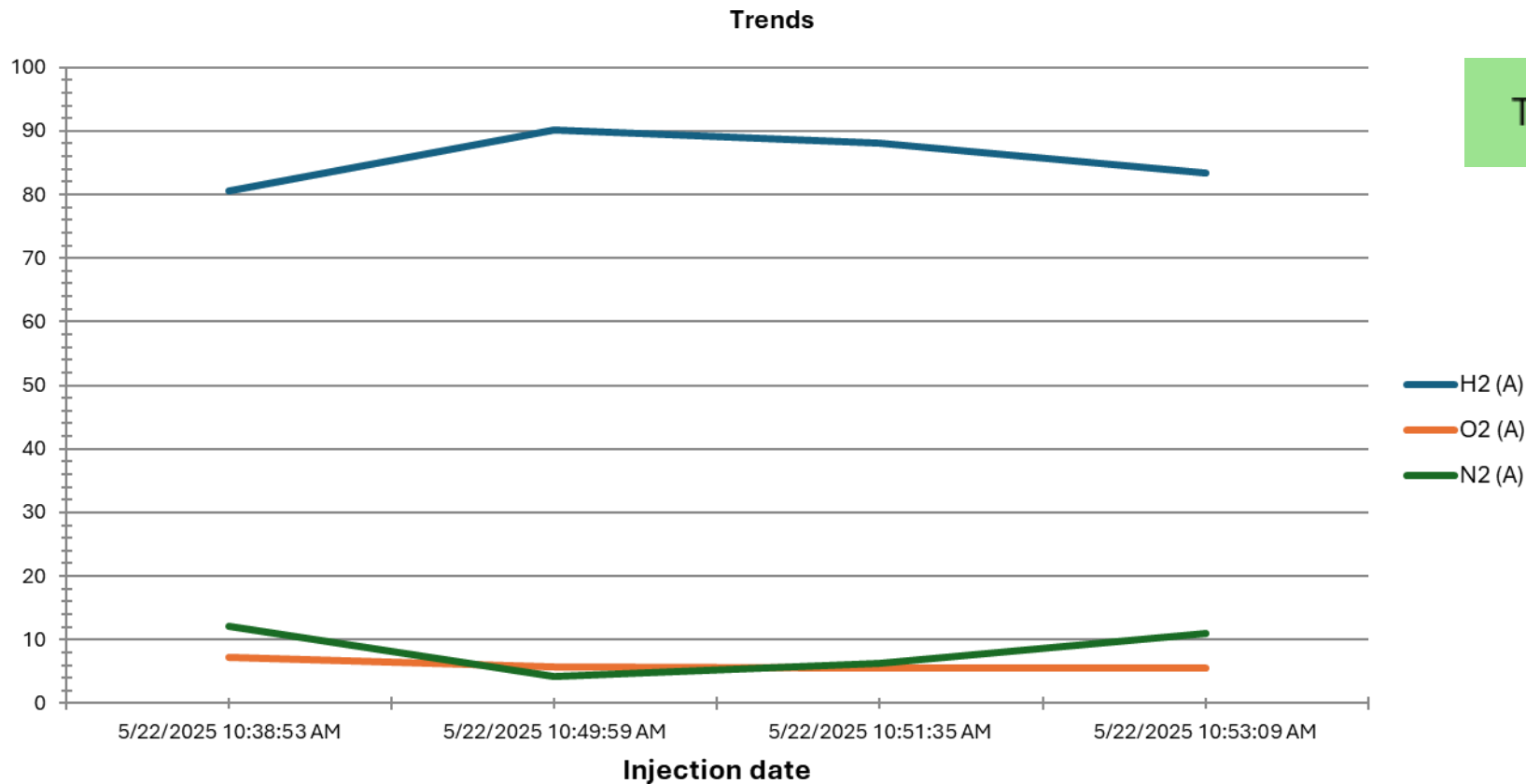
(1% NaCl solution, AISI 316L electrodes, 1000V power supply)

Pressure UM2.4



# 2.2 UM 2.0 production $H_2$ - Concentration

(1% NaCl solution, AISI 316L electrodes, 1000V power supply)



Total amount of H2 = 3,66 mg

# 2.3 UM 3.0 in PA

(1% NaCl solution, Ti electrodes, 900V power supply)

Summary of test conditions:

Conditions									
Voltage (V)	Electrode distance (mm)	Electrode material	Electrode shape	Frequency (Hz)	Number of shots	Solute	Solvent	Concentration	Reactor Version
900	<i>Details available upon signing a non-disclosure agreement (NDA) – patent application pending</i>					NaCl	H <sub>2</sub> O	1%	3

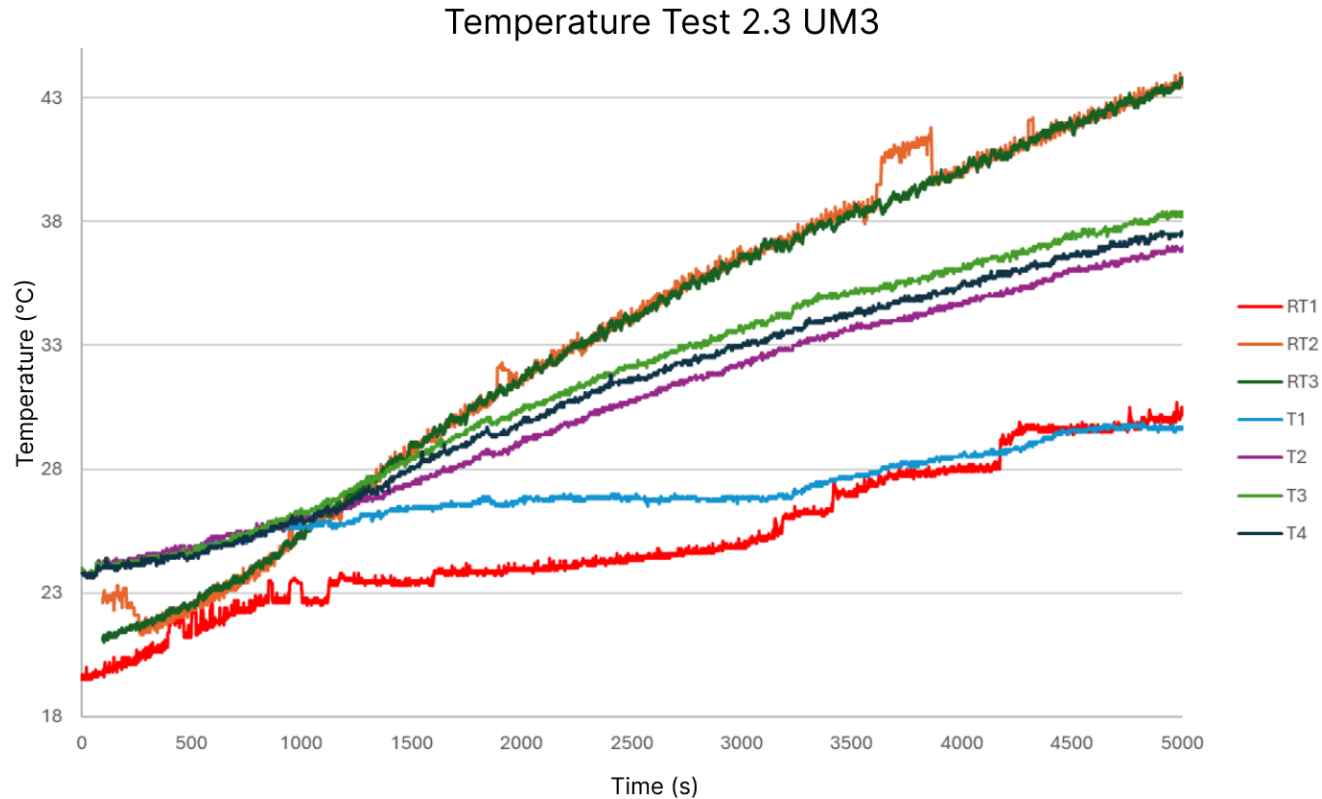
Measured quantities during the experiment							
Quantity	Acquired	Unit	Description	Initial	Intermediate	Final	Other
T environment	✓	°C	Ambient temperature				
Tr1	✓	°C	Lower internal temperature	19,5		31,4	
Tr2	✓	°C	Intermediate internal pressure	21		43,9	
Tr3	✓	°C	Upper internal pressure	21,2		43,7	
Pr	✓	barg	Internal pressure	0		0	
T1	✓	°C	Lower surface temperature	23,9		29,9	
T2	✓	°C	Intermediate surface temperature	23,8		37,1	
T3	✓	°C	Upper body surface temperature	23,9		38,5	
T4	✓	°C	Upper tested surface temperature	23,8		37,9	

The gas in the chamber was extracted at regular intervals



## 2.3 UM 3.0 in PA - Temperatures

(1% NaCl solution, Ti electrodes, 900V power supply)

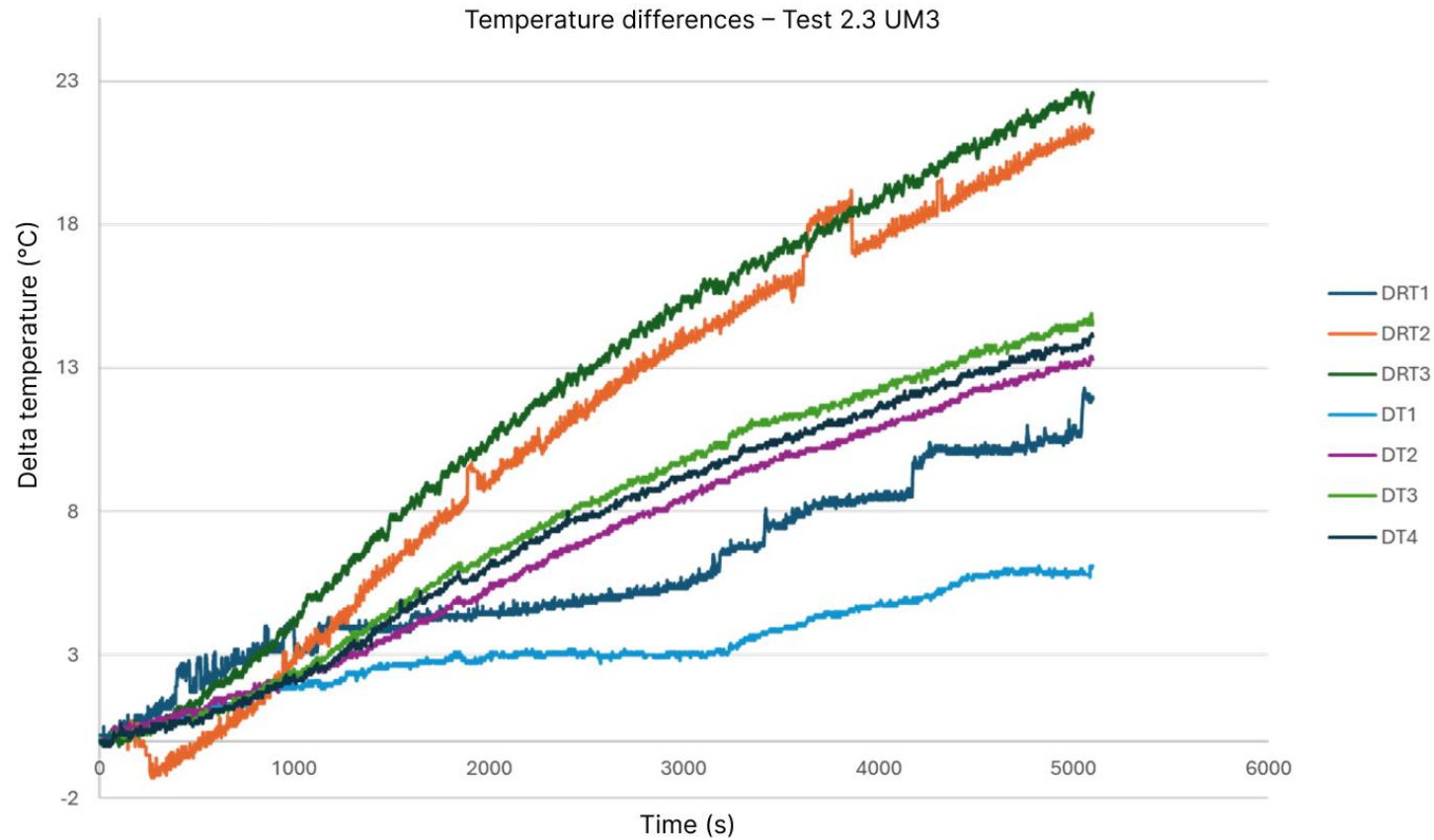


RT = temperatures in the UM3 reactor

T = temperatures on the outer surface of the UM 3 reactor

## 2.3 UM 3.0 in PA – delta temperatures

(1% NaCl solution, Ti electrodes, 900V power supply)

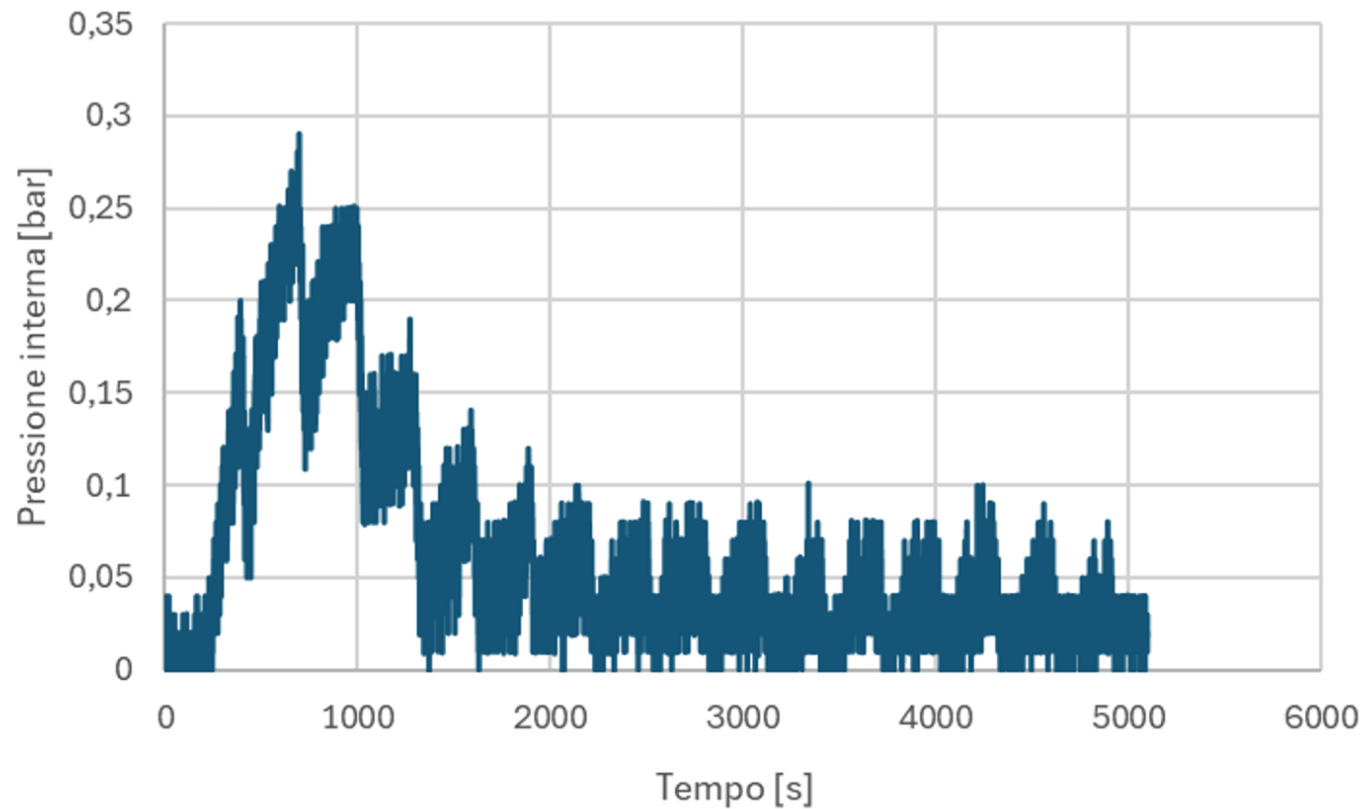


RT = temperatures in the UM3 reactor

T = temperatures on the outer surface of the UM 3 reactor

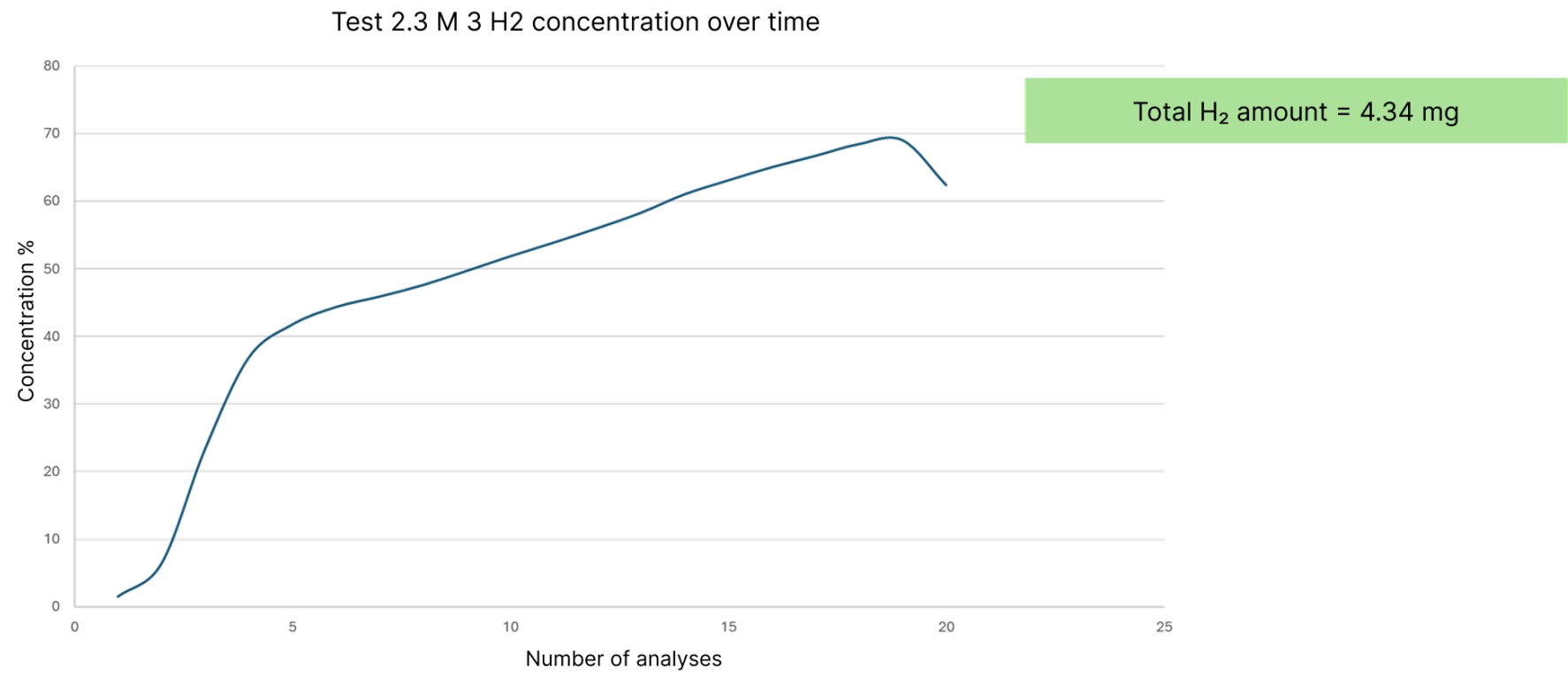
## 2.3 UM 3.0 in PA – Internal pressure

(1% NaCl solution, Ti electrodes, 900V power supply)



# 2.3 UM 3.0 in PA – $H_2$ concentration

(1% NaCl solution, Ti electrodes, 900V power supply)



*\*Calculated considering the workflow defined in the files Report\_Massa\_Idrogeno.docx and Modello\_per\_calcolo\_H2\_da\_GC\_v1.xls*

# Conclusions: Heat and hydrogen

## HEAT

Test	System	Equivalent applied power (W)	Voltages (V)	Capacitor capacity	Energy introduced (J)	$\Delta$ Reactor temp. (°C)	Energy (J)	Power generated (W)	$\Delta\%$
1.1	UM 2.0	2.25	300	100 $\mu$ F	$\cong$ 2700	> 2.6	$\cong$ 4000	3.33	$\cong$ 1.48
1.3	Std. Resistor	2.25	/	/	$\cong$ 2700	$\cong$ 2.2			
1.2	UM 2.0	12.25	700	100 $\mu$ F	$\cong$ 14700	$\cong$ 14	$\cong$ 18000	15	$\cong$ 1.22
1.4	Std. Resistor	12.25	/	/	$\cong$ 14700	$\cong$ 10			

## H<sub>2</sub>

Test	System	Equivalent applied power (W)	Voltage (V)	Capacitor capacity	Energy introduced (J)	P <sub>max</sub> (bar)	% H <sub>2</sub> by volume	H <sub>2</sub> (mg)
2.2	UM 2.4	25	1000	100 $\mu$ F	$\cong$ 50000	> 2	$\cong$ 90	3.66
2.3	UM 3.0 PA	40.5	900	100 $\mu$ F	$\cong$ 202500	$\cong$ 0.3	$\cong$ 70	4.34

# Conclusions: heat and hydrogen

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- Comparative tests between UM 2.0 powered by the Prometheus system and a standard resistor, under the same applied power, show different temperature trends.
- Both tests at 2.25W and 12.25W confirm that the Prometheus system generates a higher amount of heat.
- Test 1.1 shows the ratio between the power released as heat (3.3 W) and the input power (2.25 W), equal to 1,48
- With the Prometheus system, pressure is generated in the chamber due to the generation of gas, mainly H<sub>2</sub>
- When the chamber is emptied of gases by applying negative pressure relative to atmospheric pressure, hydrogen production reaches concentrations equal to or greater than 90% by volume.
- Test 2.3, with the reactor of greater capacity (UM 3.0), demonstrated continuous heat and hydrogen production.
- According to the calculation model proposed by Prometheus, the energy balance between the measured input and resulting output (heat and H<sub>2</sub>) favours the latter.



Thank you

Contini