# **PRIME LABS**

**Battery and Environmental Testing** 



## **Prime Labs**



- State-of-the-art testing laboratories
- Over 3.000 m<sup>2</sup> test area
- Unique testing possibilities
  - Electrical
- Environmental
- Mechanical
- Abuse
- Operating world-wide







## **Our Vision**

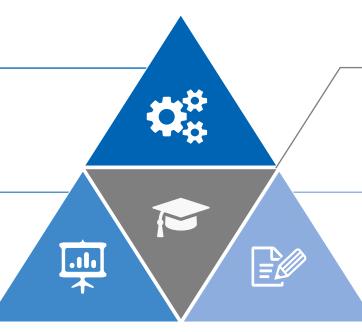


#### Industrial R & D

Solving challenges for companies using and manufacturing batteries; from improvements to cell design to battery pack development

#### **Guidance**

Providing added value to testing, technology scouting, product development as well as conducting seminars and training courses



#### Public research & Own projects

Grant-based research in cooperation with academia and industry as well as own projects to explore novel ideas and stay up-to-date

#### **Testing + Certification**

Testing of battery materials, cells, modules and packs based on customer test plans to support development and accredited testing and certification based on international standards (IEC, ISO)



## **Our Team**



For the success of our customer our employees provide

- competence and passion
- high quality work
- reliability
- independency
- fast decision times
- customer focus
- support and guidance

Jan Geder

Head of Laboratory, Singapore Expert Energy Storage Systems





Andreas Hauser

Deputy Head of Laboratory, Singapore Expert Energy Storage Systems



Lemuel Moraleia Technical Engineer

Dr. Jochen Mähliß





Holger Kühlmeyer Head of Power Electronics **Expert Functional Safety** 



Combined decades of **battery** experience



Peter Bartsch Technical Engineer



Energy Storage Systems

Tobias Schäfer Technical Engineer

Dominik Hennefeld

Head of Laboratory, Offenbach **Expert Batteries** 



Benjamin Seitz Technical Engineer

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Deputy Head of Laboratory, Offenbach **Expert Batteries** 



Patrick Heininger Project Manager Batteries and

Andreas Hasenstab





# **Electrical Testing**



Testing of batteries, modules and battery assemblies, consisting of multiple modules, intended for use in electric vehicles and stationary ESS

- Performance
- Life-cycle/Ageing
- External short circuit
- Internal short circuit
- Overcharge
- Overdischarge

- Voltages from 0 V to 1 kV DC
- Currents up to 1.440 A
- Power rates up to 500 kW

Test channels available					
Channels	Parallel Option	U <sub>min</sub>	U <sub>max</sub>	l <sub>min</sub>	I <sub>max</sub>
146	no	0	5	-5	5
144	yes (max 4)	0	5	-5	5
12	no	0	18	0	8
3	yes	0	45	-10	10
72	yes (max 2)	0	4.5	-25	25
13	yes	3	60	-60	25
3	yes	0	1000	0	25
40	no	0	5	0	50
61	yes	0	6	-50	50
10	yes	10	70	0.05	50
6	yes	1	18	0.1	100
2	yes	0	500	1	100
24	yes	0	6	0.2	200
5	no	3	100	0.2	200
4	yes	0	6	-240	240
2	yes	3	100	0.2	250
8	yes	0	6	0.3	300
2	yes	3	600	0.3	300
4	yes	0	11	-360	360
2	yes	3	600	-400	400
2	yes	3	1000	-400	400
1		0	1000	0.5	600



# **Mechanical Testing**



- Vibration
- Shock
  - half sine
  - saw tooth
  - rectangle
- Drop
- Crush

- Shaker 120kN
- 1.2 m x 1.2 m base
- 1.000 kg max. load
- With climate chamber





# **Environmental Testing**



- Altitude simulation (2.4 m³)
- Temperature shock and cycling
- Corrosion
- Sun simulation
- Ingress protection
- EMC
- REACh/RoHS

- More than 30 climate chambers
- Up to 1200L
- -70 °C to +180 °C
- 25 K/min





# **Abuse Testing**



- Crush
- Nail penetration
- Short circuits
- Overcharge
- Overdischarge
- Overheat / Thermal abuse
- Fire Propagation
- Battery forensics

- Four abuse chambers
- Innovative fire fighting equipment
- Venturi gas washer (100 m³/min)





## **Standards and Certifications**



#### **Power Tools and Consumer Products**



- UN 38.3
- IEC 60086
- IEC 60335-2-107 Annex KK
- IEC 61960
- IEC 62133
- IEC 62281
- IEC 62841-1 Annex K

#### **Automotive and LEV**



- UN 38.3
- UN ECE R100 Rev.2 screening
- UN ECE R136 screening
- ISO 12405
- ISO 16750
- IEC 62660
- DIN EN 50604-1
- AK-LH 5.21

## **Stationary Energy Storage Systems**



- UN 38.3
- DIN/EN 62619
- DIN/EN 62620
- VDE AR 2510-50
- BVES Safety Guidelines

## **Our certifications**



ID 40000000

- VDE mark, VDE-GS mark
- VDE test report for information
- CB certificate



# Thank you for your attention!

We are shaping the e-deal future. Join in.

## Your contact person:

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