



Powerful **A**dvanced **N**-Level **D**igital **A**rchitecture
for models of electrified vehicles and their components

<https://project-panda.eu/>

Research Innovation Action

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Virtual product development and production of
all types of electrified vehicles and components

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Publishable Executive Summary

This deliverable is part of WP8 (Ethic requirements) and gives the details on the materials which will be imported to/exported from the EU.

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1. Introduction

In order to fulfil the PANDA project, the following items cross the European borders:

- Bluways has to import a battery cell from Korea.
- TY, our Serbian partner, will provide ULille, UTCN and VUB with electronic equipment.

It is the aim of this deliverable (D8.2) that the exchanges across EU borders in the framework of the PANDA project follow national/EU legislation.

2. Material imported by Bluways

After an evaluation of all battery technologies available, Bluways has selected the NMC Kokam cell for the PANDA application. This cell is now the center of the e-storage developments. It is used for the e-storage modelling and testing tasks as well as the LCA activity.

Attached are the documents provided by Bluways showing that this material meets European safety regulations (appendix 1: Safety Data Sheet) and was legally imported (appendix 2: Transportation Certificate).

3. Materials sent by TY to the other partners

TY will provide HIL-ECU's (hardware-in-the-loop electronic control units) to ULille, UTCN and VUB. The HIL-ECU are custom-made for the partners, the design of which depends on the equipment already available in the labs.

For ULille, the connector interface for the HIL-ECU will be composed of two main parts, one for the electrical machine, the other one for the battery. Here is the list of the components TY will use to make this HIL-ECU:

Total number	Type of connection
Controllable mechanical source of rotational speed (electric drive)	
16	Analogic BNC -10/+10V
2	Digital (RS232/485)
4	Digital (gray code)
1	sub-d 37 (2-lines) / Digital PWM from Typhoon
Controllable current electrical source (Batteries)	
17	Input Analogic IEC connector 100mV/+100mV
3	CAN
15	Analogic I/O card sub-d 15 - 3 lines (7 input/6 output/3 GND)
1	1 sub-d 15 Analogic – 3 lines
1	Digital I/O card sub-d 15 - 3 lines
dSPACE communication	
2	sub-d 37 (2-lines)
3	sub-d 50 (3-lines)

The connector interfaces for the HIL-ECU units of VUB and UTCN are not yet defined in such precise terms, but we know that VUB's HIL-ECU unit will focus on battery and that the one of UTCN will be on electrical machine.

Even in the absence of the precise interface specifications, we can say that the connector interface for VUB will be similar to the "controllable current electrical source (Batteries)" of ULille and that the connector interface for UTCN similar to its "controllable mechanical source of rotational speed (electric drive)".

When they will be available, all the documents related to the import of the 3 HIL-ECU units will be kept on file by TY and ULille.

4. Conclusions

This deliverable provides details on the material that was (NMC Kokam cell) and will be imported (3 HIL-ECU units) into the EU. The documents linked to their import process are kept on file.

5. Deviations from Annex 1

There are no deviations.

6. Acknowledgement

The author(s) would like to thank the partners in the project for their valuable comments on previous drafts and for performing the review.

Table 1: Project Partners

#	Type	Partner	Partner Full Name
1	UNIV	ULille	Université de Lille
2	IND	SISW	Siemens Industry Software SRL
3	UNIV	VUB	Vrije Universiteit Brussels
4	IND	VEEM	VALEO Equipement Electriques Moteur SAS
5	UNIV	UTCN	Universitatea Tehnica Cluj Napoca
6	SME	TY	Tajfun HIL (Typhoon HIL)
7	IND	TUV	TUV SUD AG
8	UNIV	UBFC	Université Bourgogne Franche-Comté
9	SME	UNR	Uniresearch BV
10	IND	RTR	Renault Technologie Roumanie
11	SME	Bluways	BlueWays International bva



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Appendix A – Quality Assurance

As part of the quality assurance procedure:

- The following questions should be answered by all reviewers (WP Leader, peer reviewer 1, peer reviewer 2 and the technical coordinator);
- Questions answered with NO should be motivated. The author will then make an updated version of the Deliverable. When all reviewers have answered all questions with YES, only then the Deliverable can be submitted to the EC.

NOTE: For public documents this Quality Assurance part will be removed before publication.

Question	WP Leader	Peer reviewer 1	Peer reviewer 2	Technical Coordinator
	Amandine LEPOUTRE (ULille)	Willem van DORP UNR)	Niculae BOICEA (RTR)	Alain BOUSCAYROL (ULille)
1. Do you accept this deliverable as it is?	Yes	Yes	Yes	Yes
2. Is the deliverable completely ready? If not, please indicate and motivate required changes.	Yes	Yes	Yes	Yes
3. Does this deliverable correspond to the DoW?	Yes	Yes	Yes	Yes
4. Is the Deliverable in line with the PANDA objectives?	Yes	Yes	Yes	Yes
a. WP Objectives?	Yes	Yes	Yes	Yes
b. Task Objectives?	Yes	Yes	Yes	Yes
5. Is the technical quality sufficient?	Yes	Yes	Yes	Yes



SLPB Safety Data Sheet

Section 1 Identification

1.1	Product Name	Superior Lithium Polymer Battery (SLPB)
1.2	Battery Type	Rechargeable Battery
1.3	Description	Lithium Cobalt Manganese Nickel Oxide
1.4	Model	SLPB Series
1.5	Electrochemical System	<p>Negative Electrode - Carbon</p> <p>Positive Electrode - Lithium Cobalt Manganese Nickel Oxide (LiMnNiCoO₂)</p> <p>Electrolyte - Solution of lithium hexafluorophosphate(LiPF₆) in a mixture of organic solvent Ethylene Carbonate + Ethylmethyl Carbonate</p>
1.6	Manufactured by	<p>Kokam Co., Ltd</p> <p>[Head office] 30-78, Gyeongsu-daero 1220beon-gil, Jangan-gu, Suwon-si, Gyeonggi-Do, Republic of Korea, ZIP 440-851</p> <p>[Factory] 19, Gayagongdan-gil, Gayagok-myeon, Nonsan-si, Chungcheongnam-do, Republic of Korea, ZIP 320-844</p>
1.7	Emergency Situation	<p>For Hazardous Materials [or Dangerous Goods] Incident</p> <p>Spill, Leak, Fire, Exposure, or Accident Call CHEMTREC Day or Night</p> <p>Within USA and Canada: +1-800-424-9300 CCN200262</p> <p>Outside USA and Canada: +1 703-741-5970 (collect calls accepted)</p>
1.8	Technical Information	+82-31-362-0100 or + 82-41-740-3800
1.9	Date of Prepared	August 21, 2006
1.10	Revision Date	March 01, 2016

Section 2 Hazard(s) Identification

2.1 Classification of the substance or mixture

- No classification according to EU CLP regulation.
- No classification according to 67/548/EEC regulation.

* No classification is presented since the product is legally an article rather than chemical substance which is subject to EU CLP and/or to 67/548/EEC.

2.2 There is no hazard when the measures for handling and storage are followed.

2.3 In case of cell damage, possible release of dangerous substances and a flammable gas mixture.

Section 3 Composition/Information on Ingredients

Chemical Name	CAS Number	ACGIH TLV	% Content
Lithium Cobalt Manganese Nickel Oxide(LiMnNiCoO ₂)	182442-95-1	0.02mg/m ³ as Co 0.2mg/m ³ as Mn 0.2mg/m ³ as Ni	20-50
Carbon (Graphite, Proprietary)	7782-42-5	2mg/m ³ (R)	15 ~ 35
PVDF (1,1-Difluoroethene homopolymer; Poly(vinylene fluoride))	24937-79-9		< 8
Aluminum Foil	7429-90-5		3 ~ 12
Copper Foil	7440-50-8		3 ~12
Electrolyte	EC: 96-49-1, EMC: 623-53-0 LiPF ₆ : 21324-40-3		10 ~20
Al Film Cover	n/a		< 5

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Section 4 First-Aid Measures

In the event of battery rupture or explosion, evacuate personnel from contaminated area and provide maximum ventilation to clear out fumes/gases. In all cases, seek immediate medical attention.

4.1 Eye Contact Flush with plenty of water (eyelids held open) for at least 15 minutes.

4.2 Skin Contact Remove all contaminated clothing and flush affected areas with

plenty of water and soap for at least 15 minutes. Do not apply grease or ointments.

4.3 Ingestion

Dilute by drinking plenty of water and seek immediate medical attention. If substances are swallowed, be sure that aspiration of vomit does not occur. Ensure that mucus does not obstruct the airway. Do not prescribe oral medication/aid to an unconscious person.

4.4 Inhalation

Ventilate the contaminated area and evacuate affected personnel. Provide oxygen or artificial respiration, if necessary.

Section 5 Fire-Fighting Measure

5.1 Fire and Explosion Hazards

The battery can leak and/or release vaporized or decomposed and combustible electrolyte fumes when exposed to temperatures above 70°C; when improperly handled; or due to the environment. Cells or batteries may flame or leak potentially hazardous vapors if exposed to excessive heat or fire. Fire, excessive heat, or over voltage can potentially be hazardous and lead to decomposition of products. Damaged or opened cells or batteries can result in rapid heating and the release of flammable vapors. Vapors may be heavier than air and may travel on ground or be moved by ventilation to an ignition source and flash back. Use a positive pressure self-contained breathing apparatus if batteries are contained in a fire. Full protective clothing is necessary. During water application, caution is advised as burning pieces of flammable particles may be ejected from the fire.

5.2 Extinguishing Media

Suitable: CO₂, Water, Dry chemical or Foam extinguishers or Type D extinguishers.

5.3 Special Exposure Hazards

If cells overheat due to an external source or improper use, electrolyte leakage or battery container rupture may occur and release inner component/material in the environment.

5.3.1 Eye Contact

The electrolyte solution contained in the battery is an irritant and can damage ocular tissues.

5.3.2 Skin Contact

The electrolyte solution contained in the battery causes skin irritation.

5.3.3 Ingestion

The ingestion of electrolyte solution causes tissue damage to throat and gastro/respiratory tract.

5.3.4 Inhalation

Contents of a leaking or ruptured battery can cause respiratory tract mucus, membrane irritation and edema.

5.4 Special Protective Equipment

Use self-contained breathing apparatus to avoid breathing irritant fumes. Wear protective clothing and wash the body with an electrolyte solution.

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Section 6 Accidental Release Measure

The material contained within the batteries can only be expelled under abusive conditions. Using a shovel or broom cover the battery or expelled substances with dry sand or vermiculite. Place the battery in a separate container (after cooling, if necessary) and dispose in accordance with local regulations.

Section 7 Handling and Storage

Batteries should not be disassembled, destroyed or incinerated as they may leak, rupture and release chemicals into the environment.

7.1 Handling

Batteries are designed to be recharged. However, improperly charging a cell or battery may cause the cell or battery to ignite. Use only approved chargers and follow standard operating procedures. Never disassemble a battery or bypass any safety device. Do not crush, pierce, short (+) and (-) battery terminals with conductive (i.e. metal) goods. Do not directly heat or solder. Do not throw into fire. Do not mix batteries of different types and brands. Do not mix new and used batteries. Keep batteries in non conductive (i.e. plastic) trays.

7.2 Storage

Do not store batteries above 60°C. Store batteries in a cool (below 30°C), dry area that is subject to little temperature change. Elevated temperatures can result in reduced battery service life. Battery exposure to temperatures in excess of 130°C will result in the battery emitting flammable liquid and gases. Batteries should be separated from other materials and stored in a noncombustible, well ventilated, sprinkler-protected structure with sufficient clearance between walls and battery stacks. Do not store batteries in a manner that allows terminals to short circuit. Extended short-circuiting creates high temperatures in the cell. High temperatures can cause skin irritation or cause the cell to flame. Avoid reversing battery polarity within the battery assembly. Doing so may cause the cell to ignite or to leak. Do not place batteries near heating equipment, or expose to direct sunlight for long periods.

7.3 Other

Follow the manufacturer's recommendations regarding maximum recommended currents and operating temperature range. Applying pressure to the battery may cause disintegration, releasing irritant materials that are hazardous to the eye, skin, and throat.

Section 8 Exposure Controls and Personal Protection

No engineering controls are required for handling batteries that have not been damaged.

8.1 Respiratory Protection

It is not necessary under normal use. In event of battery rupture, use self-contained full-face respiratory equipment.

8.2 Hand Protection

It is not necessary under normal use. Use gloves when handling a leaking or ruptured battery.

8.3 Eye Protection

It is not necessary under normal use. Wear safety goggles/glasses

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8.4 Skin Protection

with side shields if handling a leaking or ruptured battery.

It is not necessary under normal use. Use rubber protective working when handling of a ruptured battery.

Section 9 Physical and Chemical Properties

9.1	State	Solid
9.2	Odor	N/A
9.3	PH	N/A
9.4	Vapor pressure	N/A
9.5	Vapor density	N/A
9.6	Boiling point	N/A
9.7	Solubility in water	Insoluble
9.8	Specific gravity	N/A
9.9	Density	N/A

Section 10 Stability and Reactivity

10.1 Conditions to avoid

- Heat above 60°C
- Deform, mutilate, crush, pierce, disassemble
- Short circuit
- Prolonged exposure to humid conditions

10.2 Materials to avoid

N/A

10.3 Hazardous Decomposition Products

- None(during normal operating conditions). If cells are opened, hydrogen fluoride(HF) and carbon monoxide(CO) may be released.

Section 11 Toxicological Information

11.1 Irritancy

The electrolytes contained in this battery can irritate eyes with any direct contact. Prolonged contact with the skin or mucous membranes may cause irritation.

11.2 Sensitization

No information is available at this time.

11.3 Carcinogenicity

No information is available at this time.

11.4 Reproductive toxicity

No information is available at this time.

11.5 Teratogenicity

No information is available at this time.

11.6 Mutagenicity

No information is available at this time.

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Section 12 Ecological Information

Ecological injuries are not known or expected under normal use. Do not flush into surface water or sanitary sewer system.

Section 13 Disposal Considerations

- 13.1 Dispose in accordance with applicable regulations according to country (in most countries, the disposal of used batteries is forbidden and the end-users are invited to dispose them properly, eventually through not-for-profit or profit organizations, mandated by the local government or organized on a voluntary basis by professionals).
- 13.2 Batteries should be completely discharged prior to disposal and/or the terminals taped or capped to prevent short circuit. When completely discharged, it is not considered hazardous.
- 13.3 This product does not contain any materials listed by the United States EPA as requiring specific waste disposal requirements. These are exempted from the hazardous waste disposal standards under Universal Waste Regulations. Disposal of large quantities of Lithium-ion batteries or cells may be subject to federal, state, or local regulations.
- 13.4 Consult your local, state and provincial regulations regarding disposal of these batteries.

Section 14 Transport Information

14.1 United Nations

- UN 3480
- Class 9
- Proper shipping name: LITHIUM ION BATTERIES

14.2 International Conventions

14.2.1 ADR/ RID - Transportation by road/rail

- UN 3480
- Class 9
- Proper shipping name: LITHIUM ION BATTERIES
- Packing instruction P903

14.2.2 IMDG - Sea Transportation

- UN 3480
- Class 9
- Proper shipping name: LITHIUM ION BATTERIES
- Packing instruction P903
- Emergency Schedule F-A, S-I
- Marine pollutant: NO

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14.2.3 IATA - AIR Transportation

- UN 3480
- Class 9
- Proper shipping name: LITHIUM ION BATTERIES
- Packing instruction 965 Section IA

14.2.4 Other: in USA Code of Federal Regulation, 49 CFR Ch.1 § 173-185

- Label



Section 15 Regulatory Information

15.1 The transport of rechargeable Lithium-ion batteries are regulated by the United Nations as detailed in the "UN Recommendations on the Transport of Dangerous Goods – Model Regulations, ST/SG/AC.10/1/19(2015)". Batteries conform to "UN Recommendations on the Transport of Dangerous Goods - Manual of Tests and Criteria, ST/SG/AC.10/11/Rev.6, Chapter 38.3".

Section 16 Other Information

- 16.1 This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty (either expressed or implied) or guarantee is made to the accuracy, reliability or completeness of the information contained herein.
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TRANSPORTATION CERTIFICATE

WWW.KOKAM.COM

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TEL) 82 - 31 - 362 - 0100 FAX) 82 - 31 - 362 - 0190

MANUFACTURING PLANT

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TEL) 82 - 41 - 740 - 3800 FAX) 82 - 41 - 742 - 9232

FILE No.	ISSUED DATE	REVISED DATE	REVISED ITEM
KQ13-NI27-01R0	September 27, 2005		




- Test spec. : UN Manual (ST/SG/AC. 10/27/Add.2.2001)
- Test place : Kokam [Self Test]
- Test date : September 27, 2005

SECTION 1 [ITEM & PRODUCT SPECIFICATION]

ITEM	SLPB100216216H	REMARK
Nominal Voltage	3.7V	
Nominal Capacity	40 Ah	
Nominal Watt-hour	148 Wh	

SECTION 2 [UN T1-T8 TEST RESULT]

No.	TEST ITEM	TEST RESULT	REMARK
T1	Altitude Simulation	Pass	
T2	Thermal Test	Pass	
T3	Vibration	Pass	
T4	Shock	Pass	
T5	External short circuit	Pass	
T6	Impact	Pass	
T7	Overcharge	-----	For pack only
T8	Forced Discharge	Pass	

ISSUED		
PREPARED	CHECKED	APPROVED
		
09 / 27	09 / 27	09 / 27