

**ATF Professional**



**HAZARDOUS  
SERVICES**

ility

# Vehicle Recycling Dismantling The Future

27th November 2019

Advanced Propulsion Centre  
Warwick UK

## Safe Handling, Storage & Processing of Lithium-Ion Batteries

Alan D Colledge DGSA CPC COTC

## **Lithium Batteries Waste – What actually can be done?**

- ▶ Issue recap
- ▶ Scale of Opportunities
- ▶ Transport / Packaging requirements
- ▶ Disposal options available to us
- ▶ Brief History - Quick shameless plug for the company

# Issue 1 - Safety Hazards



Fire



High Voltage  
Electricity



Liquid  
Electrolyte



Lifting & Moving  
Battery Units





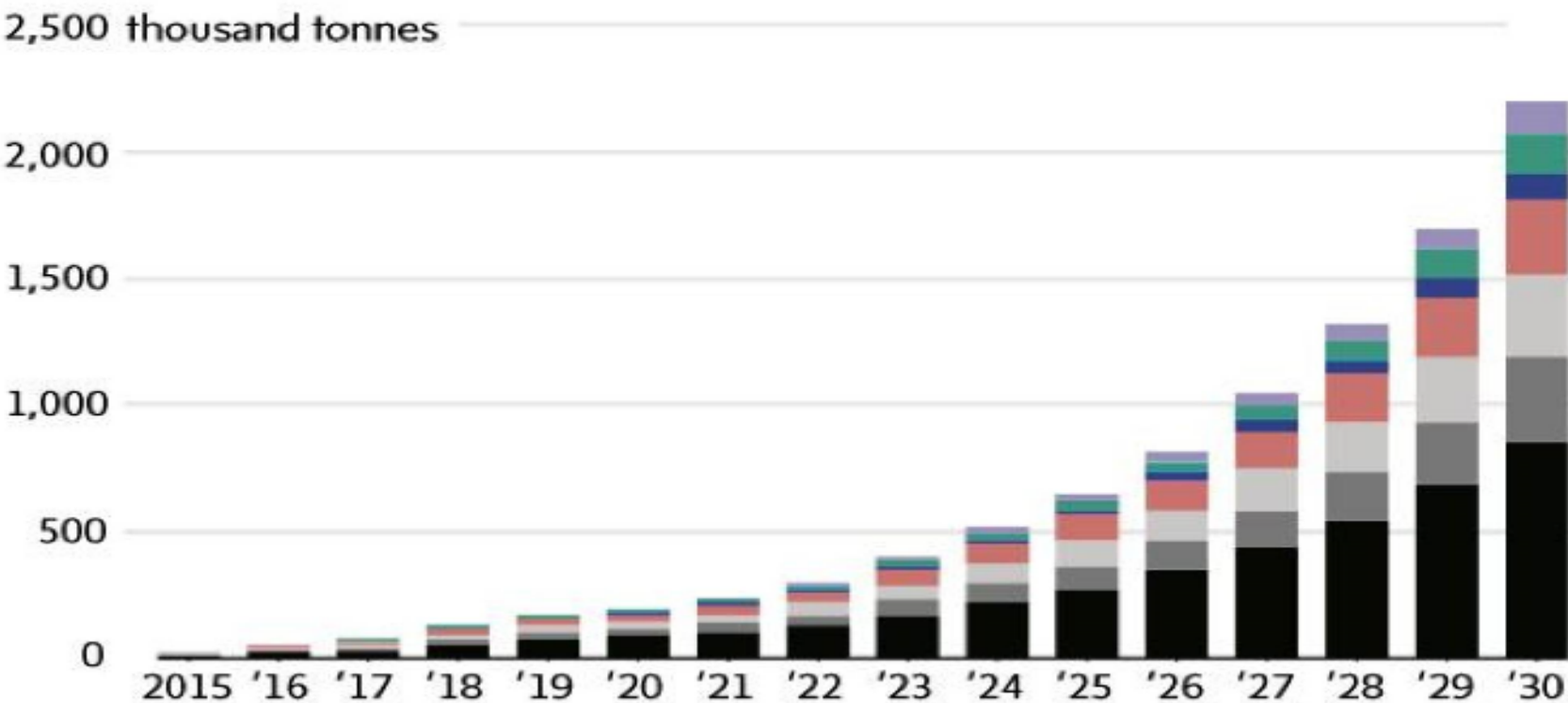
# Issue 2 - Material Scarcity



## Demand surge

Global metals and materials demand and projected demand from EV lithium-ion batteries

■ Graphite ■ Nickel ■ Alumin. ■ Copper ■ Lithium ■ Cobalt ■ Manganese



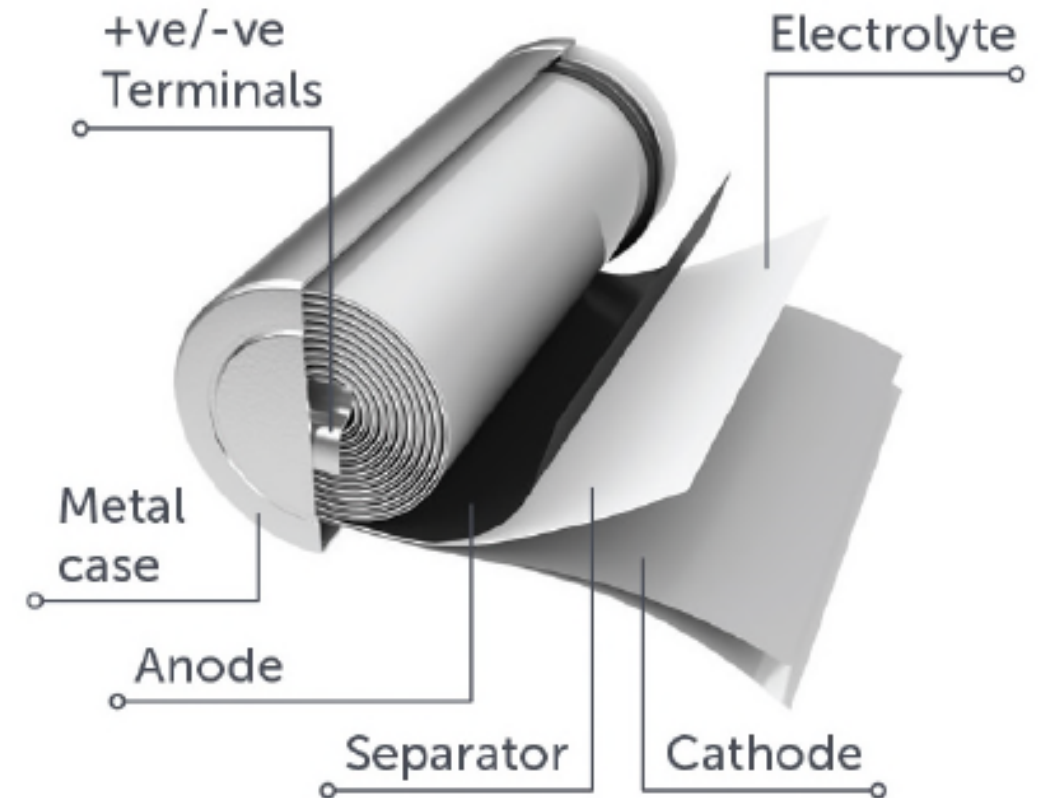
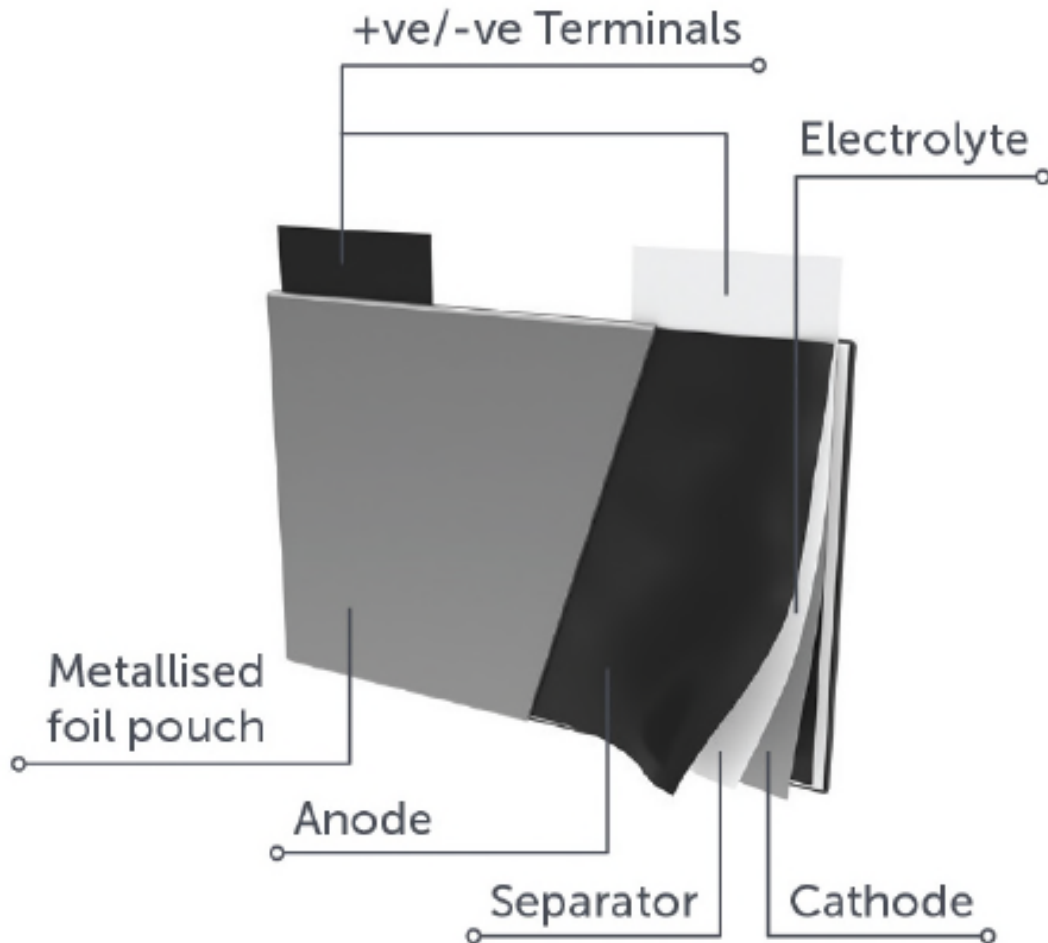
THE GLOBE AND MAIL, SOURCE: BLOOMBERG

## Issue 3 - Suspect mining



## Issue 4 – Its not easy to recycle!

### Recyclable Elements of Vehicle Battery



ad.

Source: AAA



## Issue 5 – No Commercial Metallurgical process in the UK!



7000t per annum  
Pyrometallurgical  
Hydrometallurgical



300t per annum  
Pyrolysis  
Shredding

2000t per annum  
Pyrolysis Shredding  
Pyrometallurgical



*Duesenfeld*

3000t per annum  
Shredding  
Electrolyte recovery  
Hydrometallurgical

## Issue 6 – Classification issues!

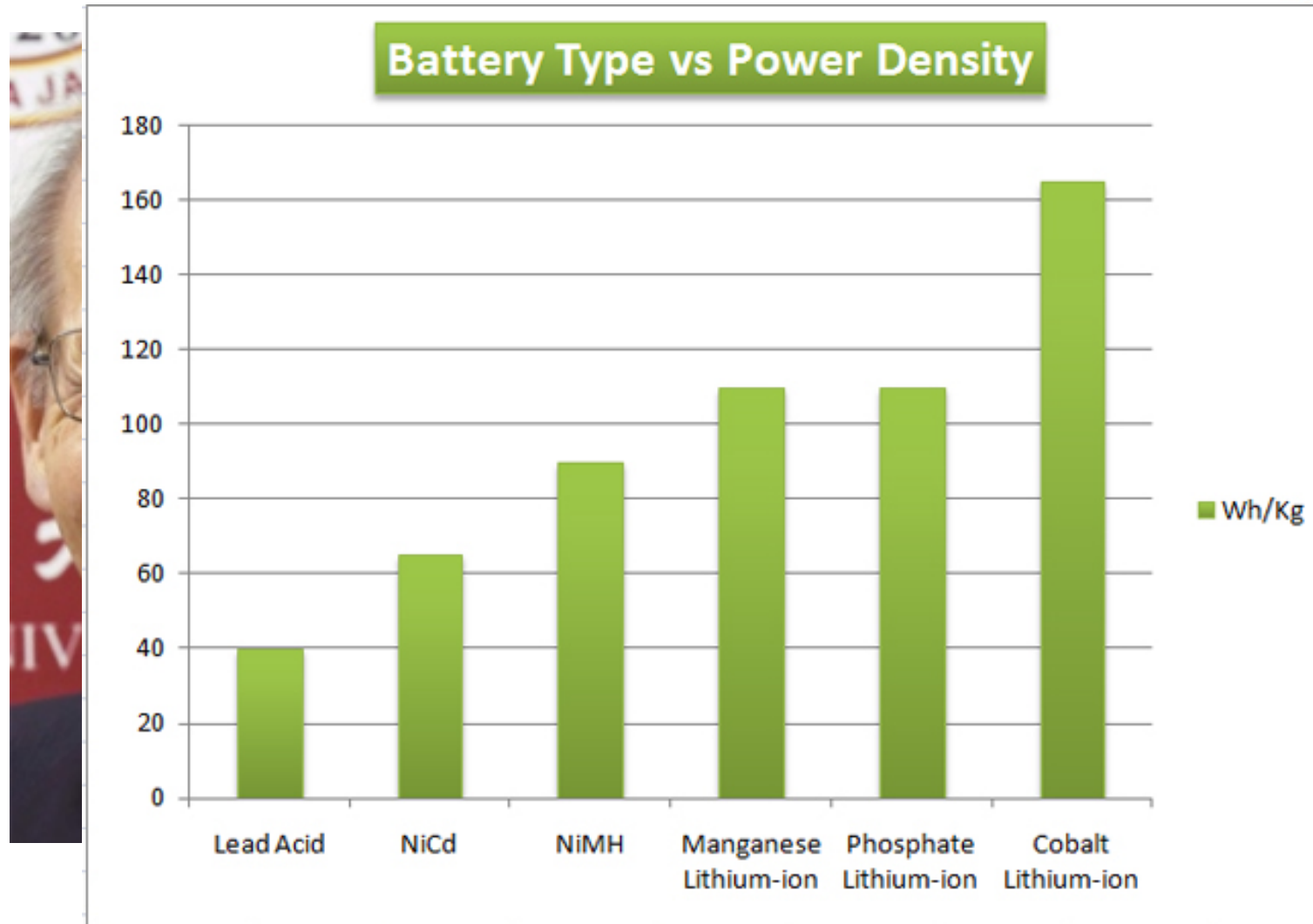


### Batteries

Waste type	Waste status	Household type	Industrial or commercial
Lead acid (vehicle)	Hazardous	16-06-01*	16-06-01*
Lead acid (other)	Hazardous	20-01-33*	16-06-01*
Nickel-Cadmium	Hazardous	20-01-33*	16-06-02*
Mercury containing	Hazardous	20-01-33*	16-06-03*
Alkaline	Non-hazardous	20-01-34	16-06-04
Other - Lithium or Lithium ion	Non-hazardous	20-01-34	16-06-05
Mixed batteries - unsorted	Hazardous	20-01-33*	Not allowed

(\*) An asterisk at the end of a code means the waste is hazardous.

# Scale of Opportunity





# Scale of Opportunity



CLEAN AIR FOR ALL

## Ban petrol and diesel vehicles before 2040, urges industry insider



## Labour party pledges to ban sale of non-electric cars by 2030

Outlawing the sale of internal combustion engine vehicles will help tackle the climate emergency, says shadow business secretary



ALL NEW CARS SOLD IN UK SHOULD BE PURE-ELECTRIC BY 2032, SAY MPS



Twitter: @transenv  
Facebook: @transenv  
Website: transportenvironment.org

Source: Published announcements, National press

# Scale of Opportunity

## FINANCIAL TIMES

### Electric and hybrid car sales jump to 10 per cent of UK total

Surge driven by tripling of sales of battery-powered vehicles



© Bloomberg

Peter Campbell in London NOVEMBER 5 2019

64

7,861

3,568

1.8%

2.3%

Sep-17

Oct-17

Nov

12,883

4,054

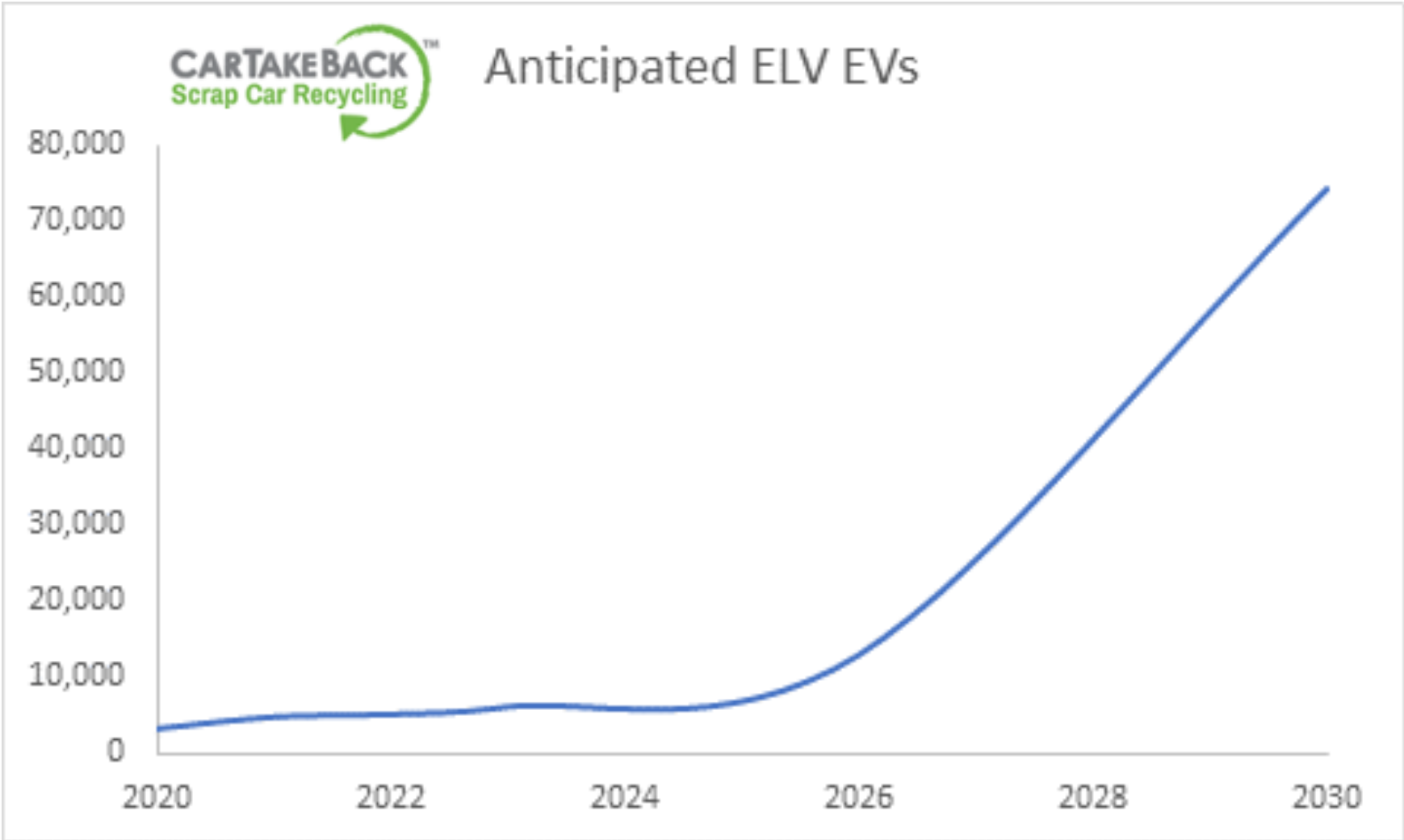
4.4%

3.8%

Aug-19

Sep-19

Scale of Opportunity





## Scale of Opportunity





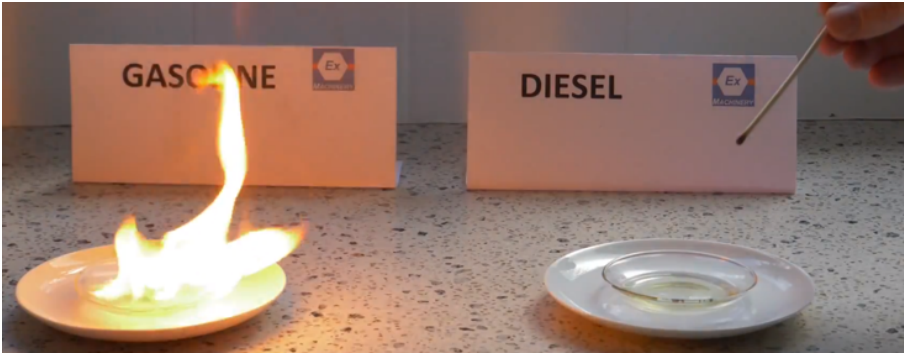
# Transport Requirements



- Salvage Container 2.0
- Full Sized EV Car transport system
- Fire Detection
- On Board Fire Suppression
- Rolonof design

...ing global responsibility

# Transport Requirements





# Transport Requirements



LP903 PGII



LP904  
PGII  
'Damaged Defective'



## Transport Requ



LP906	PACKING INSTRUCTION	LP906
This instruction applies to damaged or defective batteries of UN Nos. 3090, 3091, 3480 and 3481 liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage.		
The following large packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met: For a single battery and for a single item of equipment containing batteries; Rigid large packagings conforming to the packing group I performance level, made of: steel (50A); aluminium (50B);		

4.1.4.3

Add the following new packing instruction LP906:

LP906	PACKING INSTRUCTION	LP906
This instruction applies to damaged or defective batteries of UN Nos. 3090, 3091, 3480 and 3481 liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage.		
	<ul style="list-style-type: none"> <li>(c) No projectiles shall exit the package;</li> <li>(d) The structural integrity of the package shall be maintained; and</li> <li>(e) The large packagings shall have a gas management system (e.g. filter system, air circulation, containment for gas, gas tight packaging etc.), as appropriate.</li> </ul> <p>(2) The additional large packaging performance requirements shall be verified by a test as specified by the competent authority of any ADR Contracting Party who may also recognize a test specified by the competent authority of a country which is not an ADR Contracting Party provided that this test has been specified in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions <sup>a</sup>. A verification report shall be available on request. As a minimum requirement, the battery name, the battery number, the mass, type, energy content of the batteries, the large packaging identification and the test data according to the verification method as specified by the competent authority shall be listed in the verification report.</p> <p>(3) When dry ice or liquid nitrogen is used as a coolant, the requirements of section 5.5.3 shall apply. The inner packaging and outer packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.</p>	

# Transport Requirements



LP906 PGI



**NEFAB**

local recycling global responsibility



# Transport Requirements



## Disposal Options





# Disposal Options





# Disposal Options





# Disposal Options



# Disposal Options





## Brief History....



- ▶ 2012 started dealing with Lithium Ion Batteries in the Motorsports Industry
- ▶ Authorised Disposal Route in Europe – Approved Battery Exporter *ABE*
- ▶ All movements carried out in accordance with ADR 2019
- ▶ EA Licenced Storage Facility in the UK
- ▶ Specialist dismantling and re-pack facility in the UK



local recycling global responsibility

# About Cawleys



Cawleys is a third-generation family business with over 70 years experience in the waste management industry.



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## Questions

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