Economic Commission for Europe

Inland Transport Committee

Working Party on the Transport of Dangerous Goods **23 June 2016**

Joint Meeting of the RID Committee of Experts and the Working Party on the Transport of Dangerous Goods

Geneva, 19–23 September 2016
Item 6 of the provisional agenda
Reports of informal working groups

Report on the Working Group on the transport of WEEE containing lithium batteries – Comments received

Transmitted by the Government of Germany

Addendum

Introduction

1. This document provides additional information concerning the informal working group on the transport of waste electrical and electronic equipment containing lithium batteries. The Joint Meeting agreed that the informal working group should meet again to continue its work. Furthermore, delegations were invited to reply to the questionnaire prepared by the working group after proper coordination at national level to ensure that all interested parties have been consulted (ECE/TRANS/WP.15/AC.1/140).

2. The informal working group held its second meeting on 27 to 28 April 2016 in Bonn (see ECE/TRANS/WP.15/AC.1/2016/19). The annex of this document contains the received answers to the questionnaire on lithium batteries in WEEE that were reviewed by the working group.

Proposal

3. The Joint Meeting is invited to take note of the annexed information.

Annex

Schwan, Gudula

Von: Aleksandr Tolstoj <aleksandr.tolstoj@sumin.lt>
Gesendet: Freitag, 8. Januar 2016 08:08
An: Schwan, Gudula
Betreff: Fw: Lithium Batteries contained in WEEE
Anlagen: ECE-TRANS-WP15-AC1-2015-GE-INF13e.pdf; Questionnaire2_24_08_2015.doc

Dear Madam,

In view of information provided by the Ministry of Environment of the Republic of Lithuania, Ministry of Economy of the Republic of Lithuania and Ministry of Transport and Communications of the Republic of Lithuania we would like to inform you that at the moment there is no disposable data on the content of lithium batteries contained in waste electrical and electronic equipment (WEEE).

Kind Regards,

Aleksandr TOLSTOJ

Chief Specialist
Water and Railway Transport Policy Department
Environment Protection and Emergency Prevention Division
Ministry of Transport and Communications of the Republic of Lithuania
Phone +370 5 239 3805

http://www.sumin.lt

LIETUVOS RESPUBLIKOS
SUSISIEKIMO MINISTERIJA

----- Forwarded by Aleksandr Tolstoj/Transp on 2016.01.08 08:52 -----

From: Conrad Jochen <Jochen.Conrad@otif.org>
To: "Aleksandr Tolstoj (aleksandr.tolstoj@sumin.lt)" <aleksandr.tolstoj@sumin.lt>, "Alexandr Khristolyubov (o.g.@ngs.ru)" <o.g.@ngs.ru>, "Alexandr Volkov (cdmu@css-rzd.ru)" <cdmu@css-rzd.ru>, "Alicja Osesiak (alicja.osesiak@ec.europa.eu)" <alicja.osesiak@ec.europa.eu>, "Andrzej Sosna (a.sosna@tdt.pl)" <a.sosna@tdt.pl>, "Anghelus Gabriel Badea (ri@afer.ro)" <ri@afer.ro>, Anu Häkkinen (Anu.Hakkinen@trafi.fi) <Anu.Hakkinen@trafi.fi>, "Bolette Daugaard (bdd@trafikstyrelsen.dk)" <bdd@trafikstyrelsen.dk>, "Brian Robinson (brian@bjrsolutions.co.uk)" <brian@bjrsolutions.co.uk>, "Colin Rubery (rubery@itco.be)" <rubery@itco.be>, "Darren Freezor (darren.freezor@dft.gsi.gov.uk)" <darren.freezor@dft.gsi.gov.uk>, "Dragos Anoaica (dragos.anoaica@mt.ro)" <dragos.anoaica@mt.ro>, "Emil Akhundov (info@idgca.org)" <info@idgca.org>, "emil.akhoundov@nttrans.net" <emil.akhoundov@nttrans.net>, "Ester Fernández García Obledo - AESF - Agencia Estatal de Seguridad Ferroviaria (efgarciaobledo@seguridadferroviaria.es)" <efgarciaobledo@seguridadferroviaria.es>, "Helen North (helen.north@dft.gsi.gov.uk)" <helen.north@dft.gsi.gov.uk>, "Hicran Valehov - Azerbaijan Railways LTD, Baku (office@railway.gov.az)" <office@railway.gov.az>, "Ibrahim Halil Cevik (ibrahimhcevik@tcdd.gov.tr)" <ibrahimhcevik@tcdd.gov.tr>, "Krzysztof Grzegorczyk (k.grzegorczyk@tdt.pl)" <k.grzegorczyk@tdt.pl>, "Ksenija Peer (ksenija.peer@gov.si)" <ksenija.peer@gov.si>, "Kyriakos Doulis (kyriakos.doulis@era.europa.eu)" <kyriakos.doulis@era.europa.eu>, "Mahesh Soedeshpersad (soedesh.mahesh@rivm.nl)" <soedesh.mahesh@rivm.nl>, "Malgorzata Swiderska (malgorzata.swiderska@mir.gov.pl)" <malgorzata.swiderska@mir.gov.pl>, "Marek Rozicki (adr@edu.pl)" <adr@edu.pl>, "Milos Dunajsky (milos.dunajsky@mindop.sk)" <milos.dunajsky@mindop.sk>, "Nuria Roman Bernet (nroman@minetur.es)" <nroman@minetur.es>, "Olivier Aubertin (o.aubertin@cfbp.fr)" <o.aubertin@cfbp.fr>, "Pavel Okorochkov (okorochkov@css-rzd.ru)" <okorochkov@css-rzd.ru>, "Polonius Fabian-Alexander (fabian-alexander.polonius@daimler.com)" <fabian-alexander.polonius@daimler.com>, "Roberto Ferravante (roberto.ferravante@ec.europa.eu)" <roberto.ferravante@ec.europa.eu>, "Roh Hathlia (Roh.Hathlia@dft.gsi.gov.uk)" <Roh.Hathlia@dft.gsi.gov.uk>, "Steen Riis Thomsen (srt@trafikstyrelsen.dk)" <srt@trafikstyrelsen.dk>, "Steve Gillingham (steve.gillingham@gft.gsi.gov.uk)" <steve.gillingham@gft.gsi.gov.uk>, "Thordur Jonsson Sygtryggsson (thj@mfa.is)" <thj@mfa.is>, "Viorel Moisa (viorel.moisa@cfrmarfa.ro)" <viorel.moisa@cfrmarfa.ro>,
Date: 2015.12.01 13:49
Subject: Lithium Batteries contained in WEEE

Dear colleagues,

On behalf of the German Federal Ministry of Transport and Digital Infrastructure we send you a request to provide information on the content of lithium batteries contained in waste electrical and electronic equipment (WEEE) (see e-mail below and in the attachment).

Please send your answers directly to Ms Gudula Schwan (gudula.schwan@bmvi.bund.de).

Kind regards,

Jochen Conrad
Head of RID section
OTIF

Organisation intergouvernementale pour les transports internationaux ferroviaires
Zwischenstaatliche Organisation für den internationalen Eisenbahnverkehr
Intergovernmental Organisation for International Carriage by Rail

Gryphenhübeliweg 30
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Tel : + 41 31 359 10 17
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Fax : + 41 31 359 10 11

jochen.conrad@otif.org
www.otif.org

Dear Colleages,

please find attached a mail to some associations with the request to provide information on the content of lithium batteries contained in WEEE as agreed on the basis of the report on the informal working group on the transport of WEEE containing lithium batteries.

The delegations of the Joint Meeting are also invited to contact the concerned industry and waste disposal branch in order to provide some input.

In order to be able to consider the responses during the next Joint Meeting in March 2016 the questionnaires should be send back to the German delegation till 29th of February 2016. If possible, the questionnaire should not be answered by individual undertakings but in a coordinated manner by delegations or associations.

Kind regards

Gudula Schwan

Bundesministerium für Verkehr und digitale Infrastruktur
Ref. G 24- Beförderung gefährlicher Güter
Postfach 20 01 00, D-53170 Bonn

Federal Ministry of Transport and digital Infrastructure
Division G 24 - Transport of Dangerous Goods
P.O. Box 20 01 00, D 53170 Bonn

Tel. +49 (0) 228 300 2551

----- 0100+ on Fri, 20 Nov 2015 17:34:07 <gudula.schwan@bmvi.bund.de> "Schwan, Gudula" Message from -----
"'marta.yuste@ceced.eu'" ,<Sigrid.Linher@orgalime.org> "'Sigrid.Linher@orgalime.org'"
"'Valentina.Bolognesi@digitaleurope.org'" ,<marta.yuste@ceced.eu>
"'pascal.leroy@weee-forum.org'" ,<Valentina.Bolognesi@digitaleurope.org>**:To**
"'jpwiaux@rechargebatteries.org'" ,<pascal.leroy@weee-forum.org>
<jpwiaux@rechargebatteries.org>
Lithium Batteries contained in WEEE**:Subject**

Dear Sir, Madam,
I contact you on behalf of the informal working group on the transport of WEEE containing lithium batteries in order to see if your association can provide some information to support the discussion on the transport provisions for WEEE.

The informal working group was established by the Joint Meeting of the RID Committee of Experts and the Working Party on the Transport of Dangerous Goods, which is responsible for the development of the provisions on transport of dangerous goods in European land transport (ADR and RID). The current provisions of ADR/RID have special provisions for the collection and transport of lithium batteries (in particular special provision 636) which are also applicable to the transport of electronic and electronical waste containing lithium batteries. However, it was found that some amendments are necessary to meet the special needs of transport of WEEE in Europe as required by directive 2012/19/EU and the informal working group was instructed to review the existing requirements. Enclosed you find a report of the working groups meeting in June.

One finding of the group was, that ADR/RID provisions are mainly applied to types of equipment that typically contain lithium batteries or contain larger percentages of lithium batteries. Other appliances such as screens or large household appliances (e. g washing machines) are often treated as if they generally did not contain lithium batteries without any validation of their composition. In this context it was discussed whether a lower threshold limit of lithium batteries in WEEE below which facilitations for carriage of equipment could be granted. However, in order to be able to draw conclusions regarding possible risks, further information about the type and amount of the batteries used in different types of equipment has to be obtained from the industry. For this purpose a questionnaire was drawn up (Annex II of the report of the working group) and several associations that could assist and should have relevant information were identified (paragraph 46 of the report of the working group).

Therefore I hope that your association can help us with some information on the content of lithium batteries, either on the basis of existing information or on the basis of investigations e.g. at intermediate facilities.

The questionnaire is additionally attached in a word format. It follows the categories as defined in the WEEE directive as a guideline, but the type of WEEE may be individually specified in the second column. One question was also if some types of devices only contain small button cells which serve only as support or backup, thus the column “Function:(main)power source or support/backup” has been included in the questionnaire.

If possible, the questionnaire should not be answered by individual undertakings but in a coordinated manner by the relevant associations.

In order to be able to consider this during the next Joint Meeting in March 2016, you are kindly asked to answer till 29th of February 2016.

If you have any further questions, do not hesitate to contact me.

Kind regards

Gudula Schwan

Bundesministerium für Verkehr und digitale Infrastruktur
Ref. G 24- Beförderung gefährlicher Güter
Postfach 20 01 00, D-53170 Bonn

Federal Ministry of Transport and digital Infrastructure
Division G 24 - Transport of Dangerous Goods
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Tel. +49 (0) 228 300 2551

(See attached file: ECE-TRANS-WP15-AC1-2015-GE-INF13e.pdf)(See attached file: Questionnaire2_24_08_2015.doc)

Von: Lucia Herreras <lucia.herreras@weee-forum.org>
Gesendet: Montag, 8. Februar 2016 16:52
An: Schwan, Gudula
Cc: Pascal Leroy
Betreff: ADR Survey - data from Portugal

Please find below some data from Portugal as well.
Best regards,

Lucía

From: Monica Luizio [mailto:monica.luizio@amb3e.pt]
Sent: Monday, February 08, 2016 13:23
To: Lucia Herreras <lucia.herreras@weee-forum.org>
Subject: RE: ADR updates (Nov 2015) - action required (deadline February 2016)

Hi Lucia,

Yes, you can send them.

Please make reference that these are our best estimates as we don't perform sorting.

Best Regards,

Mónica Amaral Luízio
Operação de Gestão de Resíduos / Waste Management Operation

Amb3E - Associação Portuguesa de Gestão de Resíduos
Tel.: (+351) 21 416 90 20 - Tlm.: (+351) 91 293 69 24
monica.luizio@amb3e.pt - www.electrao.pt

From: Lucia Herreras [mailto:lucia.herreras@weee-forum.org]
Sent: 8 de fevereiro de 2016 12:13
To: Monica Luizio <monica.luizio@amb3e.pt>
Subject: RE: ADR updates (Nov 2015) - action required (deadline February 2016)

Thank you Monica,

Can I send this information as Amb3E's contribution? (meaning they will know you provided it).

Kind regards,

Lucía

From: Monica Luizio [mailto:monica.luizio@amb3e.pt]
Sent: Monday, February 08, 2016 12:44

To: Lucia Herreras <lucia.herreras@weee-forum.org>
Subject: RE: ADR updates (Nov 2015) - action required (deadline February 2016)

Dear Lucia,

Regarding battery figures we only have some sampling analysis by our treatment partner as we actually don't perform sorting.

Having said this the questionnaire, you sent is not fully compatible with the information we have available so far. Therefore, please find below our best estimates:

Small Equipment including IT and Telecommunication 2014	
Collection (ton)	12246,8
Batteries (ton)	72
Batteries Share (kg/ton)	5,88
Share Lead Acid Batteries (kg/ton)	2,35
Share Other Batteries (kg/ton)	3,53
Sampling of Li-Batteries in other Batteries (%)	15,61%
Share of Li-Batteries (kg/ton)	0,55

I hope the information can be useful.

Best Regards,

Mónica

Mónica Amaral Luízio
Operação de Gestão de Resíduos / Waste Management Operation

Amb3E - Associação Portuguesa de Gestão de Resíduos
Tel.: (+351) 21 416 90 20 - Tlm.: (+351) 91 293 69 24
monica.luizio@amb3e.pt - www.electrao.pt

From: Pascal Leroy [mailto:lucia.herreras@weee-forum.org]
Sent: 23 de novembro de 2015 12:26
To: Monica Luizio <monica.luizio@amb3e.pt>
Subject: ADR updates (Nov 2015) - action required (deadline February 2016)

This message goes to WG Collection, WG Operations and to individuals who expressed an interest in Collection

Dear all,

please find below the e-mail we have received from the ADR WG. May I kindly ask you to send us (lucia.herreras@weee-forum.org) your responses by mid February 2016? . You will find the questionnaire attached at the end of this e-mail and a report explaining the current situation on ADR WG decisions.

Thank you very much in advance.

Kind regards,

Lucía

Dear Sir, Madam,
I contact you on behalf of the informal working group on the transport of WEEE containing lithium batteries in order to see if your association can provide some information to support the discussion on the transport provisions for WEEE.

The informal working group was established by the Joint Meeting of the RID Committee of Experts and the Working Party on the Transport of Dangerous Goods, which is responsible for the development of the provisions on transport of dangerous goods in European land transport (ADR and RID). The current provisions of ADR/RID have special provisions for the collection and transport of lithium batteries (in particular special provision 636) which are also applicable to the transport of electronic and electronical waste containing lithium batteries. However, it was found that some amendments are necessary to meet the special needs of transport of WEEE in Europe as required by directive 2012/19/EU and the informal working group was instructed to review the existing requirements. Enclosed you find a report of the working groups meeting in June.

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Therefore I hope that your association can help us with some information on the content of lithium batteries, either on the basis of existing information or on the basis of investigations e.g. at intermediate facilities.

The questionnaire is additionally attached in a word format. It follows the categories as defined in the WEEE directive as a guideline, but the type of WEEE may be individually specified in the second column. One question was also if some types of devices only contain small button cells which serve only as support or backup, thus the column “Function:(main)power source or support/backup” has been included in the questionnaire.

If possible, the questionnaire should not be answered by individual undertakings but in a coordinated manner by the relevant associations.

In order to be able to consider this during the next Joint Meeting in March 2016, you are kindly asked to answer till 29th of February 2016.

If you have any further questions, do not hesitate to contact me.

Kind regards

Gudula Schwan

Bundesministerium für Verkehr und digitale Infrastruktur
Ref. G 24- Beförderung gefährlicher Güter
Postfach 20 01 00, D-53170 Bonn

Federal Ministry of Transport and digital Infrastructure
Division G 24 - Transport of Dangerous Goods

Answer El-Kretsen Sweden

Questionnaire

1. Introduction:
Waste electrical and electronic equipment containing lithium batteries is subject to dangerous goods provisions. In order to make the collection and carriage of waste electrical and electronic equipment practicable and safe, the Joint Meeting is currently addressing the question as to whether the existing provisions should be updated. An informal working group of the Joint Meeting has met in this connection. One of the results of this meeting was that the question as to whether there should be additional facilitations for the carriage of WEEE should be considered further. For instance, large household appliances with a small backup battery (e.g. washing machine with a button cell) or lots of electrical and electronic equipment containing only a minimal percentage of lithium batteries are also subject to dangerous goods provisions. In order to be able to make statements about possible risks, information about the type and amount of the batteries used in different types of equipment is needed as a basis for further discussion.

The industry concerned is therefore asked to provide information about lithium batteries in WEEE, if possible. This information is to be entered in the matrix below.

If possible, the questionnaire should not be answered by individual undertakings but in a coordinated manner by the relevant associations. We kindly ask you to send the completed matrix below to lucia.herreras@weee-forum.org.

In order to be able to consider this during the next Joint Meeting in March 2016, you are kindly asked to answer till 29th of February 2016.

2. Matrix

Information on contained lithium batteries/cells in WEEE **Type/category of WEEE[1]**	**Further specification of WEEE, if applicable[2]**	**Share of lithium batteries (including lithium cells) in WEEE[3]**	**Function: (main)power source or support/backup**	**Mass (g)/ Nominal energy (Wh)/ Lithium content (g)**	**Remarks**
Temperature exchange equipment					1)
Screens, monitors, and equipment containing screens having a surface greater than 100 cm²	1. LCD screen	**[kg Li batt/ton Weee]** 1. 40			1)
Lamps	1. Luminaires for domestic use	**[kg Li batt/ton Weee]** 1. 0			1)
Large equipment Household appliances; IT and telecommunication equipment; consumer equipment; luminaires; equipment reproducing sound or images, musical equipment; electrical and electronic tools; toys, leisure and sports equipment; medical devices; monitoring and control instruments; automatic dispensers; equipment for the	1. CRT monitors 2. LCD TV 3. CRT TV 4. Music appliances 5. Vacuum cleaners	**[kg Li batt/ton Weee]** 1. 0 2. 0 3. 0 4. 0 5. 0			1)

Information on contained lithium batteries/cells in WEEE / Type/category of WEEE[1]	Further specification of WEEE, if applicable[2]	Share of lithium batteries (including lithium cells) in WEEE[3]	Function: (main)power source or support/backup	Mass (g)/ Nominal energy (Wh)/ Lithium content (g)	Remarks
generation of electric currents. (Other than No. 1 to 3)					
Small equipment Household appliances; consumer equipment; luminaires; equipment reproducing sound or images, musical equipment; electrical and electronic tools; toys, leisure and sports equipment; medical devices; monitoring and control instruments; automatic dispensers; equipment for the generation of electric currents. (Other than No 1 to 3 and 6).	1. Multi function products 2. Computers(stat./port.) 3. Computer (stat) 4. Computer (portable) 5. Dvd/Vhs/blueray	**[kg Li batt/ton Weee]** 1. 0.52 2. 6.56 3. 0.273 4. 83.59 5. 0			1)
Small IT and telecommunication equipment (no external dimension more than 50 cm)	1. Cell phones 2. Radio and reciever	**[kg Li batt/ton Weee]** 1. 153 2. 0			1)

Remarks

1) The basis for these figures is a study from 2012.

Results from 2015

1) Statistically every other product that is collected contain a battery (60% of the number of products collected had a battery).
2) On weight basis this amount to 12 % (kg batteries per kg assorted electrical goods).
3) Average weight for a product containing a battery is 0.6 kg.

Conclusions

1) The batteries collected in equipment is frequently occurring but mainly contained in small appliances (60% of the number of products but only 12% on mass basis).
2) The amount of batteries in equipment with a mass above 0.5 kg is likely to be small since the total weight of a product including its battery is 0.6 kg on average. This does however need further evaluation since 0.6 kg is only an average number.

[1] The categories correspond to the categories as defined in Annex III of Directive 2012/19/EU on waste electrical and electronic equipment (WEEE). When the information on batteries/cells refers only to parts of the described category, specify further.

[2] Indicate if the relevant group does not correspond to the WEEE category as described in column 1 (e.g. due to national collection regimes) and describe further, e.g. function of the appliances

[3] Indicate reference parameters, e.g. kg of lithium batteries per t of WEEE.

Fragebogen

1. Einleitung:

Elektro- und Elektronik-Altgeräte welche Lithiumbatterien enthalten, unterliegt Gefahrgutvorschriften. Um die Sammlung und Beförderung von Abfällen auf Elektro- und Elektronikaltgeräten durchführbar und sicher zu machen, bespricht die Gemeinsame Tagung derzeit die Frage, ob die bestehenden Vorschriften aktualisiert werden sollten. Eine informelle Arbeitsgruppe der Gemeinsamen Tagung hat sich in diesem Zusammenhang getroffen. Eines der Ergebnisse dieses Treffens war, dass die Frage, ob es zusätzliche Erleichterungen für die Beförderung von WEEE geben sollte, müsste weiter geprüft werden. Beispielsweise ob auch große elektrische Haushaltsgeräte mit einem kleinen Pufferbatterie (z.B. eine Waschmaschine mit einer Knopfzelle) oder ganze Posten elektrischer und elektronischer Altgeräte, die nur einen minimalen Prozentsatz an Lithium-Batterien enthalten, den Gefahrgutvorschriften unterliegen sollten? Um Aussagen über mögliche Risiken machen zu können, sind als Grundlage für die weitere Diskussion Informationen über die Art und Menge der in verschiedenen Gerätetypen verwendet Batterien nötig.

Die betroffene Branche ist daher aufgefordert, wenn möglich Informationen über Lithium-Batterien in Elektro- und Elektronikaltgeräten zur Verfügung zu stellen. Diese Informationen sind in der unten stehenden Matrix einzugeben.

2. Tabelle

Information zu LIB in WEEE EAG[1] Typ/Kategory	falls nötig, weitere Angaben zu EAG[2]	LIB in EAG[3]	Funktion: (Haupt)Versorgung oder Notversorung	Masse/g Nennenergie/Wh Lithiumgehalt/g	Bemerkungen
1. Wärmeüberträger Kühlschränke, Gefriergeräte, Geräte zur automatischen Abgabe von Kaltprodukten, Klimageräte, Entfeuchter, Wärmepumpen, ölgefüllte Radiatoren und andere Wärmeüberträger, bei denen andere Flüssigkeiten als Wasser für die Wärmeübertragung verwendet werden.	Diese Geräte enthalten in der Regel keine LIB für die Hauptversorgung und Notversorgung.	Keine LIB Ev. Stützbatterien	Nur als Stützversorgung nicht für Haupt oder Notbetrieb.	Keine Angeben	Sammlung nur in CH Gehört nicht ins Swico Sortiment (SENS)
2. Bildschirme, Monitore und Geräte, die Bildschirme mit einer Oberfläche von mehr als 100 cm^2 enthalten. Bildschirme, Fernsehgeräte, LCD-Fotorahmen, Monitore, Laptops, Notebooks.	Bildschirmgeräte entsprechen 96 % des Gesamtgewichtes dieser Kategorie Bildschirme enthalten in der Regel nur Stützbatterien	Laptops, Notebooks, Powerbook, Tablets entsprechen 4 % des Gesamtgewichtes dieser Kategorie 63.58% der Geräte enthalten LIB. Davon sind 0.11 % defekt.	Hauptversorgung und Stützversorgung durch Knopfzellen	Keine Angaben	Sammlung nur in CH Quelle Warenkorbanalyse Swico
3. Lampen (Leuchtmittel) Stabförmige Leuchtstofflampen, Kompaktleuchtstofflampen, Leuchtstofflampen, Entladungslampen (einschließlich Hochdruck-Natriumdampflampen und Metalldampflampen), Niederdruck-Natriumdampflampen, LED-Lampen.	Diese Produkte enthalten keine LIB	Keine Angaben	Keine Angaben	Keine Angaben	Sammlung nur in CH Gehört nicht ins Swico Sortiment (SENS / SLRS)

Information zu LIB in WEEE EAG[1] Typ/Kategory	falls nötig, weitere Angaben zu EAG[2]	LIB in EAG[3]	Funktion: (Haupt)Versorgung oder Notversorung	Masse/g Nennenergie/Wh Lithiumgehalt/g	Bemerkungen
4. Großgeräte Waschmaschinen, Wäschetrockner, Geschirrspüler, Elektroherde und -backöfen, Elektrokochplatten, Leuchten, Ton- oder Bildwiedergabegeräte, Musikausrüstung (mit Ausnahme von Kirchenorgeln), Geräte zum Stricken und Weben, Großrechner, Großdrucker, Kopiergeräte, große Geldspielautomaten, medizinische Großgeräte, große Überwachungs- und Kontrollinstrumente, große Produkt- und Geldausgabeautomaten, Photovoltaikmodule. (andere als No 1 - 3)	Ton und Bildschirmgeräte erfasst in IT /UE / Rest siehe Kat. 5	z.T. nur Stützbatterien	Nur als Stützversorgung nicht für Haupt oder Notbetrieb.	Keine Angaben	Sammlung nur in CH Haushaltsgrossgeräte gehört nicht ins Swico Sortiment (Sens)
5. Kleingeräte Staubsauger, Teppichkehrmaschinen, Geräte zum Nähen, Leuchten, Mikrowellengeräte, Lüftungsgeräte, Bügeleisen, Toaster, elektrische Messer, Wasserkocher, Uhren, elektrische Rasierapparate, Waagen, Haar- und Körperpflegegeräte, Taschenrechner, Radiogeräte, Videokameras, Videorekorder, Hi-Fi-Anlagen, Musikinstrumente, Ton- oder Bildwiedergabegeräte, elektrisches und elektronisches Spielzeug, Sportgeräte, Fahrrad-, Tauch-, Lauf-, Rudercomputer usw., Rauchmelder, Heizregler, Thermostate, elektrische und elektronische Kleinwerkzeuge, medizinische Kleingeräte, kleine Überwachungs- und Kontrollinstrumente, kleine Produktausgabeautomaten, Kleingeräte mit eingebauten Photovoltaikmodulen. (andere als No 1 - 3 und 6).	IT / UE / Rest ohne Drucker, Scanner, Grosskopierer, Mobiltelefone, Bildschirmgeräte und Monitore und Haushaltskleingeräte (Sens Artikel)	0.25% der Geräte mit LIB davon sind 2.04 % defekt.	Hauptversorgung	Keine Angaben	Sammlung nur in CH Quelle Warenkorbanalyse Swico
6. Kleine IT- und Telekommunikationsgeräte (keine äußere Abmessung beträgt mehr als 50 cm) Mobiltelefone, GPS-Geräte, Taschenrechner, Router, PCs, Drucker, Telefone.	Nur Mobiltelefone	Mobiltelefone 37.26% der Geräte enthalten LIB davon sind 3.96% defekt	Nur für Hauptversorgung	Keine Angaben	Aussage: Diese Angaben treffen nur bei Mobiltelefone zu. Sammlung nur in CH Quelle Warenkorbanalyse Swico

[1] Die Kategorien entsprechen den Kategorien, wie in Anhang III der Richtlinie 2012/19 / EU über Elektro- und Elektronik-Altgeräte (WEEE) definiert. Machen Sie weitere Angaben, falls die Informationen zu Batterien / Zellen sich nur auf Anteile der beschriebenen Kategorie beziehen.

[2] Vermerken Sie, falls die relevante Gruppe nicht der WEEE-Kategorie in Spalte 1 entspricht (zB wegen nationaler Sammlungssysteme) und beschreiben Sie sie weiter, z.B. Funktion der Geräte.

[3] Geben Sie die Grösse und Einheit an, beispielsweise "LIB-Gehalt in EAG" / kg/t, an.

RESPONSES TO THE QUESTIONNAIRE PREPARED BY THE GERMAN COMPETENT AUTHORITY ON THE TRANSPORT OF DANGEROUS GOODS

TRANSPORT OF LITHUM BATTERIES INCORPORATED IN WEEE. DATA COLLECTED BY RECHARGE AISBL.

Brussels, February 25th, 2016

Questionnaire

1. Introduction:

Waste electrical and electronic equipment containing lithium batteries is subject to dangerous goods provisions. In order to make the collection and carriage of waste electrical and electronic equipment practicable and safe, the Joint Meeting is currently addressing the question as to whether the existing provisions should be updated. An informal working group of the Joint Meeting has met in this connection. One of the results of this meeting was that the question as to whether there should be additional facilitations for the carriage of WEEE should be considered further. For instance, large household appliances with a small backup battery (e.g. washing machine with a button cell) or lots of electrical and electronic equipment containing only a minimal percentage of lithium batteries are also subject to dangerous goods provisions. In order to be able to make statements about possible risks, information about the type and amount of the batteries used in different types of equipment is needed as a basis for further discussion.

The industry concerned is therefore asked to provide information about lithium batteries in WEEE, if possible. This information is to be entered in the matrix below.

2. Matrix

	Information on contained lithium batteries/cells in WEEE Type/category of WEEE[1]	Further specification of WEEE, if applicable[2]	Share of lithium batteries (including lithium cells) in WEEE[3]	Function: (main)power source or support/backup	Mass (g)/ Nominal energy (Wh)/ Lithium content (g)	Remarks
1	Temperature exchange equipment					
2	Screens, monitors, and equipment containing screens having a surface greater than 100 cm²	Cordless Equipment = Laptops, Tablets, PA (Personal Assistants), GSM location systems,...	Li-Ion. Battery Ratio by weight of WEEE: 5-30%	Main Power	Rechargeable Li-Ion. Generally below the 100 Wh limit	See Figure 3 in the report.
3	Screens, monitors, and equipment containing screens having a surface greater than 100 cm²	Appliances with a cable to connect to the main: large screens, TV monitors, ...	Li-Metal. Battery Ratio by weight of WEEE: 0.1 % by w. < Li-M < 1.0% by w.	Memory Back-up function	Primary Lithium-Metal batteries. Average battery weight 3.4 g with a Lithium Content < 1.0 g	Large majority of button cells
4	Lamps					
5	Large equipment Household appliances; IT and telecommunication equipment; consumer equipment; luminaires; equipment reproducing sound or images, musical equipment; equipment for the generation of electric currents. (Other than No. 1 to 3)	Some appliances with a timer or memory	Li-Metal. Battery Ratio by weight of WEEE: < 0.1 % by w.	Memory Back-up function	Primary Lithium-Metal batteries. Average battery weight 3.4 g with a Lithium Content < 1.0 g	Large majority of button cells

	Information on contained lithium batteries/cells in WEEE Type/category of WEEE[1]	Further specification of WEEE, if applicable[2]	Share of lithium batteries (including lithium cells) in WEEE[3]	Function: (main)power source or support/backup	Mass (g)/ Nominal energy (Wh)/ Lithium content (g)	Remarks
6	Small equipment Household appliances; consumer equipment; luminaires; equipment reproducing sound or images, musical equipment; electrical and electronic tools; toys, leisure and sports equipment; medical devices; monitoring and control instruments; automatic dispensers; equipment for the generation of electric currents. (Other than No 1 to 3 and 6).	See below (§ 14 >...).				
7	Medical devices; automatic dispensers;	Corded Equipment	Li-Metal. Battery Ratio by weight of WEEE: < 0.1 %	Memory back-up	Primary Lithium-Metal batteries. Average battery weight 3.4 g with a Lithium Content < 1.0 g	Large majority of button cells
8	Medical devices; automatic dispensers;	Cordless Equipment (portable/wearable)	idem	idem	idem	NB Some equipment may contain a rechargeable battery.
9	Electrical and electronic tools; toys	Cordless Equipment	Li-Ion. Battery Ratio by weight of WEEE: 5-30%	Main Power	Rechargeable Li-Ion. Generally below 100 Wh limit.	

	Information on contained lithium batteries/cells in WEEE Type/category of WEEE[1]	Further specification of WEEE, if applicable[2]	Share of lithium batteries (including lithium cells) in WEEE[3]	Function: (main)power source or support/backup	Mass (g)/ Nominal energy (Wh)/ Lithium content (g)	Remarks
10	Monitoring and control instruments; (Metering equipment)	Cordless Equipment	Li-Metal. Battery Ratio by weight of WEEE: (1-20%)	Main Power	Primary Lithium-Metal batteries. Average battery weight 34.0 g with a Lithium Content that may reach 1.0 to 2.0 g per unit.	Majority of cylindrical cells in metering equipment
11	Leisure and sports equipment;	Corded equipment	Li-Metal. Battery Ratio by weight of WEEE: < 0.1 %	Memory back-up	Primary Lithium-Metal batteries. Average battery weight 3.4 g with a Lithium Content < 1.0 g	Large majority of button cells
12	Active sport watch, time watch, calculators, price tagging, diving computers,...	Cordless equipment	Li-Metal. Battery Ratio by weight of WEEE: 1-5%.	Main Power	Primary Lithium-Metal batteries. Average battery weight 3.4 g with a Lithium Content < 1.0 g	
13	Small equipment Household appliances; consumer equipment; luminaires; equipment reproducing sound or images, musical equipment; electrical and electronic tools; toys, leisure and sports					

	Information on contained lithium batteries/cells in WEEE Type/category of WEEE[1]	Further specification of WEEE, if applicable[2]	Share of lithium batteries (including lithium cells) in WEEE[3]	Function: (main)power source or support/backup	Mass (g)/ Nominal energy (Wh)/ Lithium content (g)	Remarks
	equipment; medical devices; monitoring and control instruments; automatic dispensers; equipment for the generation of electric currents. (Other than No 1 to 3 and 6).					
14	Small IT and telecommunication equipment (no external dimension more than 50 cm)	E.g. Small mobile phones	Li-Ion. Battery Ratio by weight of WEEE: 5-30%	Main Power	Rechargeable Li-Ion. Generally below the 100 Wh limit	See Figure 3 in the report.

ANNEX.

Lithium Batteries contained in Electrical and Electronic Equipment. A Report prepared by Recharge. February 25th, 2016.

[1] The categories correspond to the categories as defined in Annex III of Directive 2012/19/EU on waste electrical and electronic equipment (WEEE). When the information on batteries/cells refers only to parts of the described category, specify further.

[2] Indicate if the relevant group does not correspond to the WEEE category as described in column 1 (e.g. due to national collection regimes) and describe further, e.g. function of the appliances

[3] Indicate reference parameters, e.g. kg of lithium batteries per t of WEEE.

Lithium Batteries contained

in Electrical and Electronic Equipment

A report prepared by RECHARGE aisbl.

CONTENT.

Brussels, March 1, 2016

Lithium Batteries contained in Electrical and Electronic Equipment

1. INTRODUCTION.

This report is aiming at answering the request of the German Transport Authority for additional information regarding the presence of Lithium-Metal Primary (Li-M) and Lithium-Ion Rechargeable (Li-Ion) batteries in Waste Electrical and Electronic Equipment (WEEE) collected in EU in compliance with Directive 2012/19/EU.

i. The report is reviewing the major applications where Lithium batteries (Li-M and Li-Ion) are used and is quantifying their market volume/share by application. The data are reported by weight and number of units. These represent best estimates on the basis of the information available to RECHARGE.
ii. The main technical characteristics of the battery by application range are described: energy, voltage, capacity, Lithium content…
iii. An estimation of the ratio by weight between the battery and the equipment is presented in Tables 4 & 5.
iv. The conclusions are drafted based on this information with considerations,
    a. to the ratio of Lithium-batteries in collected WEEE, and
    b. to the types of WEEE streams that need to receive particular attention on a safety point of view or that can be relaxed from the most stringent regulatory transport requirements.

2. REVIEW OF THE LITHIUM BATTERY MARKET (Li-M and Li-Ion).

2.1. Rechargeable Lithium-Ion (Li-Ion) batteries

The market for **Rechargeable Lithium-Ion (Li-Ion)** batteries has been estimated on the basis of data published on the total energy content of batteries produced and sold per specific application and from the number of cells or batteries sold in the world[1]. It includes also an estimation of the market share of Europe per application. When available, the sales of equipment containing Lithium batteries are considered together with an average weight of the battery for a given application.

Figure 1A indicates the major applications where **Lithium-Ion Batteries** are “Placed on the Market”. The data are presented as the yearly weight of batteries sold per application. Indeed, more than 80% of these batteries are purchased with the battery incorporated in the appliance or packed with the appliance.

[1] AVICENNE. Market Survey of Lithium Rechargeable Batteries 2013.

In this study, it is estimated that the replacement market is approximately 10% of the total market for Li-Ion batteries design for a specific equipment. From a total of 55'880 Tonnes, the large majority of these batteries is placed on the market in Communication Equipment (Mobile phones, Laptops and Tablets), Cordless Power Tools and E-Mobility applications.

Figure 1B indicates the market for Li-Ion batteries by units per year. As shown on Figure 1B, when the number of batteries placed on the market is considered, the communication equipment takes more than 80 % of the market by unit.

Obviously the Lithium-Ion batteries used in communication equipment have a lower energy content than batteries used in E-Mobility applications. The reader is referred to Figure 3 for a detailed analysis of the energy content of batteries in various applications.

2.2. The market for Primary Lithium-Metal (Li-M) Batteries.

Figure 2A indicates the estimated quantities by weight of **Primary Lithium-Metal batteries** placed on the EU Market on a yearly basis. The data refers to year 2013. For these batteries, there is a significant replacement market in addition to the first sales market. The Data are obtained from a Frost and Sullivan Market Survey[2] and have been checked internally with RECHARGE's Members. Figure 2A indicates that the dominant technologies per weight are the Li-MnO2 and the Li-SOCL2 systems.

Figure 2B indicates the market for Li-Metal Primary batteries by units sold per year. In this case, the Li-MnO2 system strongly dominates the market. This is due to the commercialization of a large number of button cells of low weight and energy content for memory back-up applications.

[2] FROST & SULLIVAN. Market Survey of Primary lithium Batteries 2012.

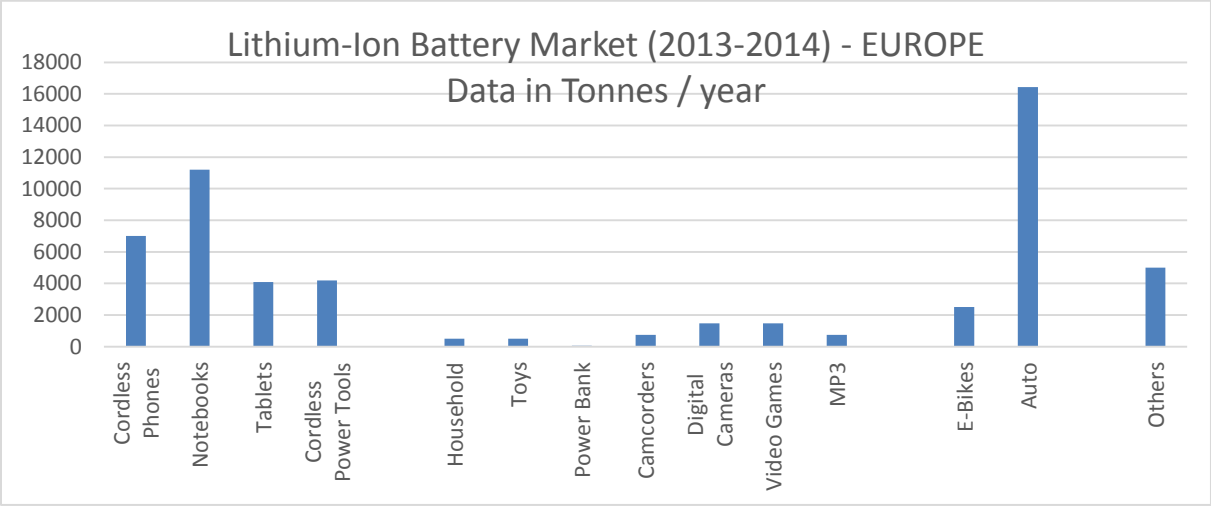

FIGURE 1 A.

Estimation of the Lithium-Ion Rechargeable Battery market in Europe (2013-2014 estimates). Data by Weight per Application: Total of 55'880 Tonnes of Li-Ion batteries per year.

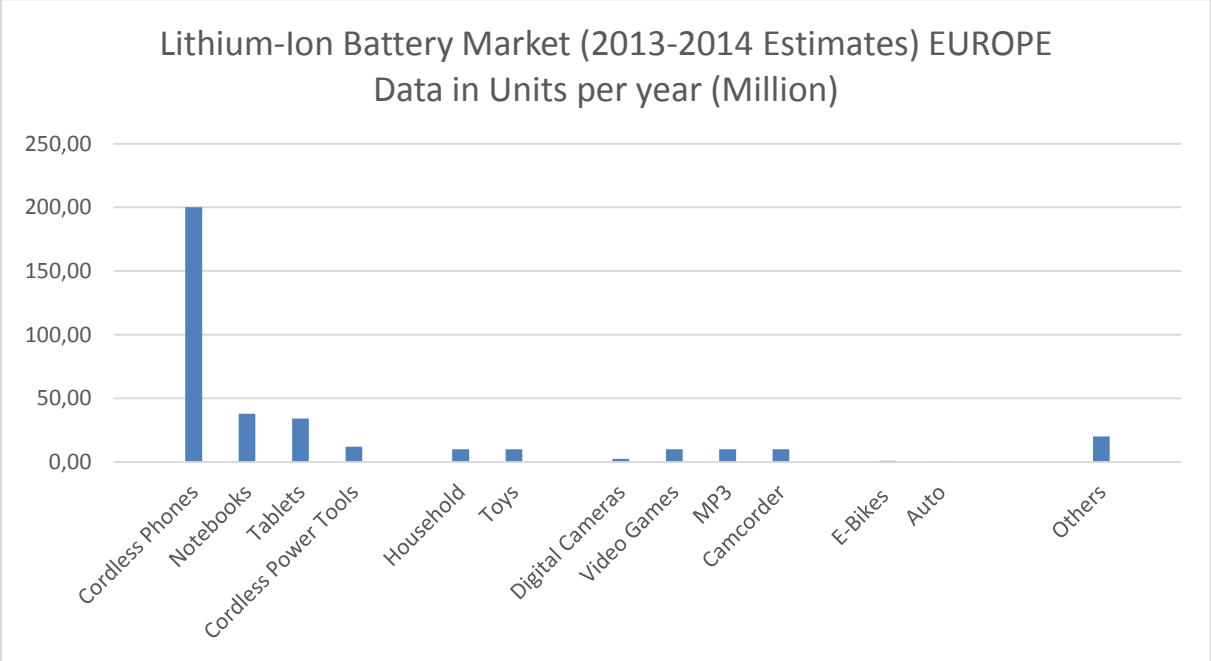

FIGURE 1 B.

Estimation of the Li-Ion Battery market in Europe (2013-2014 estimates).
Data presented in Number of Units (Million) per application.
NB. E-bikes < 1.0 Million Units & EV < 100'000 Units.

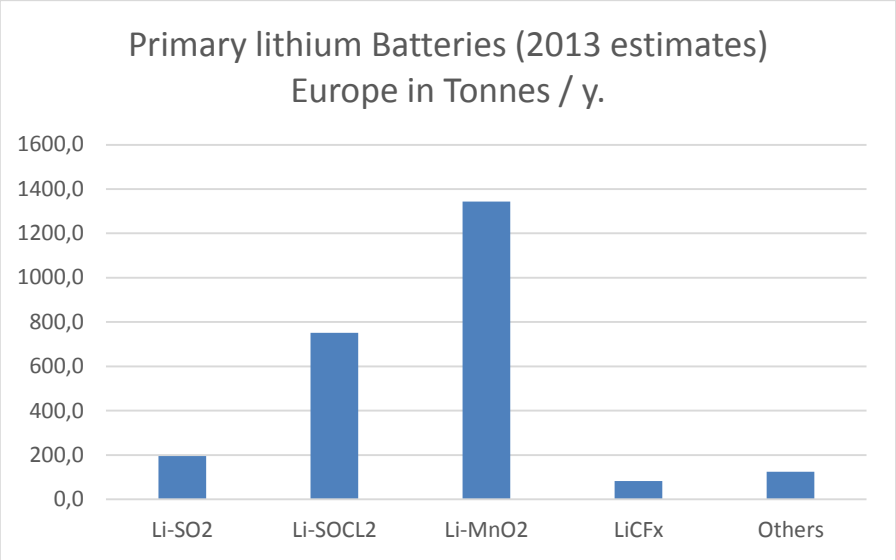

FIGURE 2 A.
Estimation of the Lithium-Metal Primary Battery market in Europe (2013-2014)
Total of 2'500 Tonnes of Lithium-Metal Primary batteries per year.

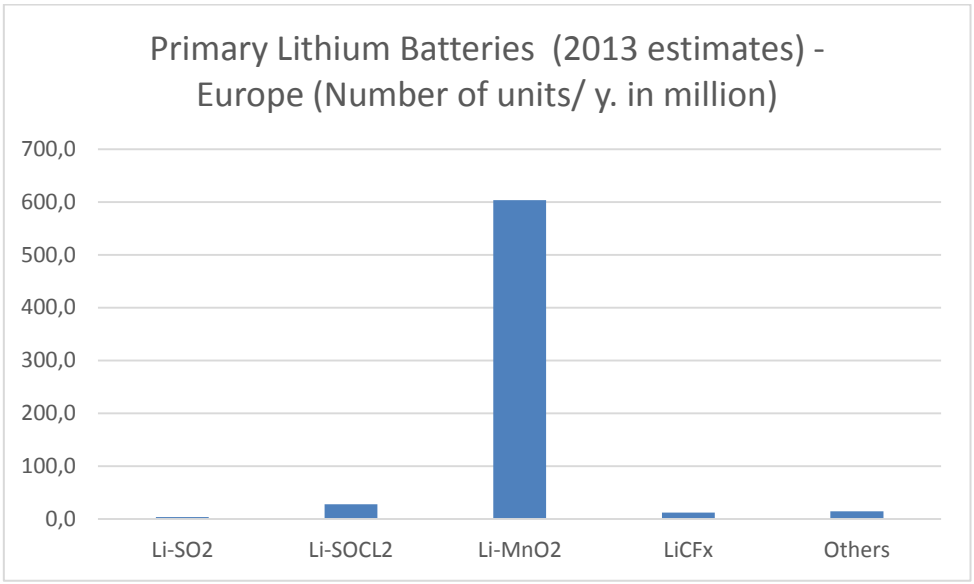

FIGURE 2 B.
Estimation of the Lithium-Metal Primary Battery market in Europe (2013-2014)
Data presented in Number of Units (Million)

3. LITHIUM BATTERIES and Electrical and Electronic Equipment (EEE)

3.1. Rechargeable Lithium-Ion Battery Market.

The data presented in Figure 1 A and 1 B for Li-Ion batteries markets have been correlated with the energy content of the batteries.

i. As illustrated in Figure 3, Lithium-Ion cells and batteries placed on the consumer (IT and Cordless Tools) market have generally an energy content lower than 20 Wh per cell or 100 Wh per battery (Yellow boxes).

ii. Until recently, on the consumer market, a majority by weight and by unit of Lithium-Ion batteries are sold in IT equipment (mobile Phones, Laptops, Tablets,…).

iii. On the Industrial Market, there is a lower number of batteries but their energy content is much higher than the 100 Wh limit. This is a market under strong development where applications are using batteries with an energy content above 1.0 kWh up to the MWh for power plants back-up energy storage (individual, community or public).

iv. Batteries for E-mobility (E-cars , E-Bikes,…) have an energy content well above the 100 Wh limit (e.g. E-Bikes) and above 1.0 kWh for the passenger E-cars (Hybrid and Full Electric).

v. There is still a majority of Cordless Power Tools equipped with batteries of less than 100 Wh energy content, but there is an increasing quantity of cordless power tools equipped with batteries above 100 Wh. These batteries are also found in gardening and innovative professional equipment (e.g. portable power modules of 1.0 kWh).

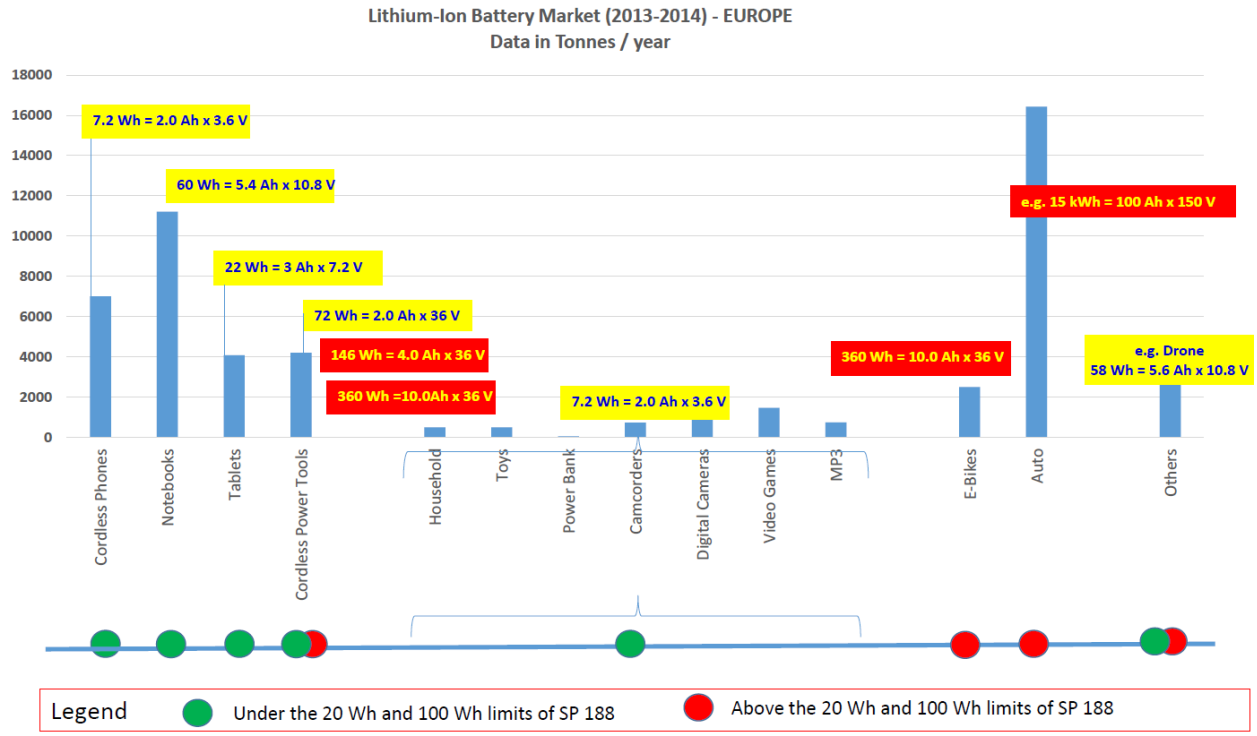

FIGURE 3.
Energy content of Lithium-Ion Batteries Placed on the market by application.
Relation with SP188 of the UN Model Regulations for the Transport of Dangerous Goods.

3.1. Primary Lithium-Metal Battery Market.

As shown in Figure 2A, the Lithium-Metal Batteries market is mainly distributed between Li-MnO2 and Li-Thionyl Chloride (LiSOCl2) systems.

As illustrated in Figure 2B, Li-MnO2 is dominating the market by units as they are mainly used as small cells in a wide variety of appliances on the consumer market. The LiSOCl2 system is used mainly in professional applications.

On the consumer market, the Li-MnO2 is mainly sold as button cell. These batteries are used in a wide variety of applications either as main power or as memory back up applications. From the analysis of Figure 2A and 2B, one can calculate an average weight per Li-MnO2 cell of 2.1 g per cell. This is further illustrated in TABLE 1 that includes data published by VARTA[3] and SAFT[4].

As shown in TABLE 2, the Lithium content of these button cells is less than 1.0 g. For the consumer market, they are based in a large majority on the Li-MnO2 chemistry.

One considers that several hundreds of millions of such cells are introduced on the EU market either directly as cells or as part of a larger equipment.

Regarding Lithium Thionyl Chloride batteries the analysis of Figure 2A and 2B leads to a calculation of 33.0 g as an average weight for Lithium Thionyl Chloride batteries.

In Table 3, the information presented relates to higher energy density Lithium-Metal batteries that may contain more than 1.0 g of Lithium per cell or more than 2.0 g of Lithium per battery. Their Lithium content is larger than the exception limits of SP188 under the UN Model Transport regulation. They are mainly LiSOCl2 batteries with a high Lithium Metal content and are mainly used in industrial, military ad space applications.

4. LITHIUM BATTERIES WITHIN APPLICATIONS.

4.1. Primary Lithium Metal Batteries.

As mentioned, on the consumer market, the major use of Li-M batteries by number is **the memory back up** application. In many cases, the battery represents less than 1.0 % by weight compared to the weight of the appliance. This is illustrated in TABLE 4.

[3] VARTA HANDBOOK OF BATTERIES
[4] SAFT SELECTOR GUIDE

In several applications, **the Li-M battery is a major source of power**, it is the case for the Li-MnO2 systems in e.g. calculators, watches and some electronic games. A new market has been created in price tagging in food and general stores. The quantity of Lithium embarked in these batteries remains below 1.0 g per cell or 2.0 g per battery.

When the Li-SOCl2 system is used to power equipment, it is generally in industrial applications which are returned in dedicated streams via waste management companies and professional carriers.

From the analysis of Table 4, it is confirmed that the weight ratio of Lithium-Metal batteries used as memory back-up in most consumer applications remains in the range of 1 for 100 and below, compared to the weight of equipment.

When industrial Li-M batteries are considered, attention should be paid to the fact that some of these Li-Metal batteries may still have a high residual energy content (Lithium) and therefore should be carried under fully regulated conditions.

4.2. Rechargeable Lithium-Ion Batteries.

Table 5 supplies information about the major applications where Li-Ion batteries are used. It also supplies an estimation of the ratio between the weight of batteries and the weight of equipment.

The rechargeable Li-Ion battery is mainly used as the main power source in the listed applications described in Table 5.

Being the main source of power for the appliance, it is estimated that the battery represents 5 to 20% by weight of the appliance in a large majority of applications (IT Equipment).

5. CONCLUSIONS.

5.1. The Transport of WEEE containing Lithium-Metal batteries.

Lithium-Metal Primary Batteries are used mainly for memory back-up applications and, in a limited number of equipment, as a main power source.

When used as **Memory Back-up**, they represent by weight of small fraction of the EEE (generally less than 1.0 %). Their Lithium content is well below the 1.0 g limit per cell and 2.0 g limit per battery indicated in the SP188 of the UN Model Regulations for the Transport of Dangerous Goods.

They are generally fixed on the printed circuit board of the equipment, difficult to access, and therefore well protected during transport either as new or as waste.

As a result, the transport of WEEE containing Memory Back-up batteries should be considered with some relaxation from the Transport Requirements of UN Model Regulation for the Transport of Dangerous Goods.

When **industrial take back schemes** are considered, attention should be paid to the fact that some of these Primary Li-Metal batteries may have a high residual energy content and therefore should be carried under the current regulation for the Transport of Dangerous Goods.

NB. It is advisable to maintain the Li-M battery in the equipment when transported to intermediate processing facilities. It is not recommended to separate Li-M batteries from the equipment at collection points. When these batteries are transported in bulk from collection points and when they are not protected individually against short circuits in the packaging, there is a fire hazard between unprotected cells.

5.2. The Transport of WEEE containing Lithium-Ion batteries.

Modern portable EEE appliances, instruments and equipment are powered by Lithium batteries.

When one excludes the E-mobility market and one considers the consumer market, a majority by weight and by unit of Lithium-Ion batteries are sold in IT equipment (mobile Phones, Laptops, Tablets,…). Some of these batteries are returned and collected with primary alkaline batteries (not-lithium based) via the Portable Batteries Compliance Collection Schemes, but a significant number is returned with WEEE.

Lithium Ion Rechargeable Batteries are the major source of power for mobile electrical equipment, they may represent by weight a significant ratio of the appliance (typically in the range of 5-20%).

Dedicated attention should be brought for the carriage of these batteries and equipment in accordance with the new Special Provisions SP377 and P909 of the UN Model Regulation for the Transport of Dangerous Goods, would they be contained or not in the equipment.

Industrial Li-Ion batteries have to be taken back by producers when reaching an end of life. The conditions of transport o these batteries are also regulated by the UN Model Regulation for the Transport of Dangerous Goods (SP377 & P909).

RECHARGE aisbl.

JPWx & CC.

Brussels, February 2016.

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TABLE 1.
List of applications for Lithium-Metal Primary Batteries.
(From VARTA Handbook and SAFT Selector Guide)

	Lithium-MnO2		Li-MnO2 & Li-SOCl2		Li-SOCl2	
	Button Cells		Cylindrical Cell Spirally Wound		Cylindrical Cell Bobbin	
SOURCE: VARTA Technical Handbook	**Main Power Source**	**Memory Back-Up**	**Main Power Source**	**Memory Back-Up**	**Main Power Source**	**Memory Back-Up**
Telecommunications			High drain		Low Drain	
Std. Desk Tel.		+		+		+
Cordless Tel.		+		+		+
Cellular Tel.		+				
Moble Radio		+		+		+
PABX				+		+
Consumer Products						
Electronic Games	+					
Watch / Clock	+		+			+
Calculator	+					
Compass				+		+
Car Radio		+				
Video Recorder		+				
Washing & Dishwash. Mach.		+				
MicroWave Oven		+				
Cooking Oven		+				
Cordless Power Tools		+				
Utility Meters						
Gas Meter			+		+	
Heat Distribution Meter					+	
Electric Meter					+	
Water Meter			+		+	
Office Automation						
Computer		+				+
Copy Machine				+		+
Printer		+				
Fax		+				
Vending Machine		+				
Electronic Typewriter		+				
Process Control Equipment						
Taxi Meter		+				
Transponder			+			
Intel. Tagging	+					
Electric Parking Meter			+		+	
Data Logger						+
Dive Computer					+	
Automotive						
Car Lock	+					
Dashboard		+				
Security (e.g. tire,...)		+				

TABLE 2.
List of most currently used Li-MnO2 button cells and cylindrical cells in relation to their Lithium Metal content.
(Courtesy from VARTA).

Types	Serial N°	Li [g]	mAh
Button			
	CR 1220	0,01	35
	CR 1616	0,02	55
	CR 1620	0,02	70
	CR 2016	0,03	90
	CR 2025	0,05	165
	CR 2032	0,07	230
	CR 2430	0,09	300
	CR 2450	0,17	620
	CR 2477	0,29	1000

Types	Serial N°	Li [g]	mAh
Cylindrical			
	CR 1/2 AA	0,30	950
	CR AA	0,58	2000
	CR 123A	0,58	1550

TABLE 3.
List of most currently used cylindrical cells (LiSOCl2) in relation to their Lithium Metal content and Capacity (Courtesy from VARTA).

Cylindrical

Types	Serial N°	Li [g]	mAh
Cylindrical			
	ER 1/2 AA	0,30	1200
	ER AA	0,62	2500
	ER C	2,20	8500
	ER D	4,90	19000

TABLE 4	LIST OF APPLICATIONS FOR Li-Metal Primary Button cells						
	Indicative values of battery weight as a % by w. of the equipment.						
		Button Cells		Button cells or small cylindrical (Memory Back-up)			
WEEE CATEGORIES	SOURCE: VARTA Technical Handbook	Main Power Source	Memory Back-Up	Battery Weight (g) indicative	Equipment Weight (g) indicative	Ratio Bat./Eqt. In % by w. indicative
	Telecommunications					
6	Std. Desk Tel.		+	3	500	0,6
6	Cordless Tel.		+	3	500	0,6
6	Cellular Tel.		+	3	200	1,5
6	Mobile Radio / I-Pod		+	3	100	3
6	Laptop Tablets		+	3	1000	0,3
	Consumer Products					
5	Electronic Games	+		3	500	0,6
5	Watch / Clock	+		3	50	6
5	Calculator	+		3	100	3
5	Compass					
5	Car Radio		+	3	500	0,6
5	Video Recorder		+	3	1000	0,3
4	Washing & Dishwash. Mach.		+	3	10000	0,03
4	Cooking Oven		+	3	10000	0,03
	Utility Meters (Indicative Order of Magnitude)					
5	Gas Meter	+		35	1000	3,5
5	Heat Distribution Meter	+		5	250	2
5	Electric Meter	+		5	500	1
5	Water Meter	+		5	500	1
	Office Automation Large					
4	Computer Desktop		+	3	2000	0,15
4	Copy Machine		+	3	5000	0,06
5	Printer		+	3	5000	0,06
5	Fax		+	3	2000	0,15
4	Vending Machine		+	3	10000	0,03
5	Electronic Typewriter		+	3	1000	0,3
	Process Control Equipment					
5	Taxi Meter		+	3	500	0,6
5	Intel. Tagging - RFID	+		3	15	20
5	Electric Parking Meter	+		20	10000	0,2
	Monitoring & Control Eqt.	+				
5	Dive Computer	+		3	120	2,5
	Automotive					
5	Car Lock	+		1	20	5
NR	Dashboard	+	+	20	5000	0,4
NR	Security (e.g. tire,...)		+	20	10000	0,2

TABLE 5.
List of Applications for Lithium-Ion Batteries
INDICATIVE VALUES OF BATTERY WEIGHT vs APPLICATION WEIGHT
Of RECHARGEABLE LITHIUM-ION BATTERIES

			RECHARGEABLE CELLS and BATTERIES			Estimated Weight Contributions		
WEEE Category	List of Applications		Main Power Source	Memory Back-Up		Battery Weight (g)	Equipment Weight (g)	Ratio Bat./Eqt. In %
	Telecommunications							
6	Cellular Tel.		+			50	300	16,7
6	Personnal Assistant		+			50	300	16,7
6	Laptop/Notebook		+			300	2500	12,0
6	Tablet		+			120	1000	12,0
5	Power Bank		+			50	100	50,0
	Consumer Products							
5	Cordless Tools (Consumr)		+			250	2000	12,5
5	Cordless Tools (Pro)		+			600	3500	17,1
5	Gardening Eqt.		+			1000	10000	10,0
5	Household e.g. tootbrush		+			50	250	20,0
5	Toys		+			50	250	20,0
5	Camcorders		+			300	1500	20,0
5	Digital Camera		+			147	1000	14,7
5	Video Games		+			150	500	30,0
5	MP3		+			150	500	30,0
	Automotive							
NR	P-HEV		+			10000	2000000	0,5
NR	EV		+			350000	2000000	17,5
NR	E-Bikes		+			2000	20000	10,0
	Others							
5	Drones		+			250	2500	10,0
5	Medical Devices		+					
5	Others…		+					

Answer Eco-Systèmes France

Questionnaire

1. Introduction:
Waste electrical and electronic equipment containing lithium batteries is subject to dangerous goods provisions. In order to make the collection and carriage of waste electrical and electronic equipment practicable and safe, the Joint Meeting is currently addressing the question as to whether the existing provisions should be updated. An informal working group of the Joint Meeting has met in this connection. One of the results of this meeting was that the question as to whether there should be additional facilitations for the carriage of WEEE should be considered further. For instance, large household appliances with a small backup battery (e.g. washing machine with a button cell) or lots of electrical and electronic equipment containing only a minimal percentage of lithium batteries are also subject to dangerous goods provisions. In order to be able to make statements about possible risks, information about the type and amount of the batteries used in different types of equipment is needed as a basis for further discussion.

The industry concerned is therefore asked to provide information about lithium batteries in WEEE, if possible. This information is to be entered in the matrix below.

If possible, the questionnaire should not be answered by individual undertakings but in a coordinated manner by the relevant associations. We kindly ask you to send the completed matrix below to lucia.herreras@weee-forum.org.

In order to be able to consider this during the next Joint Meeting in March 2016, you are kindly asked to answer till 29th of February 2016.

2. Matrix

Information on contained lithium batteries/cells in WEEE / **Type/category of WEEE[1]**	**Further specification of WEEE, if applicable[2]**	**Share of lithium batteries (including lithium cells) in WEEE[3]**	**Function: (main)power source or support/backup:** **this information is not available**	**Mass (g)/ Nominal energy (Wh)/ Lithium content (g)** **this information is not available**	**Remarks**
Temperature exchange equipment		No measurement for this category			
Screens, monitors, and equipment containing screens having a surface greater than 100 cm^2		0,1 kg/ton of WEEE			
Lamps		-			
Large equipment Household appliances; IT and telecommunication equipment; consumer equipment; luminaires; equipment reproducing sound or images, musical equipment; electrical and electronic tools; toys, leisure and sports equipment; medical devices; monitoring and control instruments; automatic dispensers; equipment for the generation of electric currents.	Eco-systèmes LHHA flow (so mainly household appliances : washing machines, dryers, ovens, dishwashers, hotplates, heating appliances…)	0,0 kg/ton of WEEE			

Information on contained lithium batteries/cells in WEEE Type/category of WEEE[1]	Further specification of WEEE, if applicable[2]	Share of lithium batteries (including lithium cells) in WEEE[3]	Function: (main)power source or support/backup: this information is not available	Mass (g)/ Nominal energy (Wh)/ Lithium content (g) this information is not available	Remarks
(Other than No. 1 to 3)					
Small equipment Household appliances; consumer equipment; luminaires; equipment reproducing sound or images, musical equipment; electrical and electronic tools; toys, leisure and sports equipment; medical devices; monitoring and control instruments; automatic dispensers; equipment for the generation of electric currents. (Other than No 1 to 3 and 6).	Eco-systèmes SHHA flow (all the other WEEE)	0,5 kg/ton of WEEE			
Small IT and telecommunication equipment (no external dimension more than 50 cm)	- (is not a separate collecting flow for Eco-sytèmes)	-			

[1] The categories correspond to the categories as defined in Annex III of Directive 2012/19/EU on waste electrical and electronic equipment (WEEE). When the information on batteries/cells refers only to parts of the described category, specify further.

[2] Indicate if the relevant group does not correspond to the WEEE category as described in column 1 (e.g. due to national collection regimes) and describe further, e.g. function of the appliances

[3] Indicate reference parameters, e.g. kg of lithium batteries per t of WEEE.

Answer ~~from Bulgaria~~

„RAILWAY ADMINISTRATION"
EXECUTIVE AGENCY

MINISTRY OF TRANSPORT, INFORMATION TECHNOLOGY AND COMMUNICATIONS

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To
Ms GUDULA SCHWAN,
Division G 24 - Transport of Dangerous Goods,
Federal Ministry of Transport and digital Infrastructure
gudula.schwan@bmvi.bund.de

Министерство на транспорта, информационните технологии и съобщенията
Агенция „Железопътна администрация"
София 1000, ул."Гурко" № 5, тел.: 940 94 26
Рег. №: 05-03-1/18.02.16 дата

Letter № 05-03-1 from 06.01.2016

Subject: *Provide information on the content of lithium batteries contained in waste electrical and electronic equipment (WEEE)*

DEAR MS SCHWAN,

Railway Administration Executive Agency received a request via e-mail from Mr. Jochen Conrad - Head of RID section in OTIF. The issue was related to provide information on the content of lithium batteries contained in waste electrical and electronic equipment. From our side, all the railway undertakings (RUs) operating in Bulgaria were required to provide data on shipped WEEE quantities and to fill up the attached table/questionnaire.

According to the received inquiries, in 2015 only one railway undertaking (BDZ Cargo) transported just one wagon carried 54.065 t of WEEE. The goods were classified and carried as dangerous but the RU does not possess with the relevant data for filling up the questionnaire.

Yours sincerely,

Veselin Vasilev
Executive Director of
Railway Administration Executive Agency

Information on contained lithium batteries/cells in WEEE	Further specification of WEEE, if applicable	European waste category (10 categories)	Share of lithium batteries (including lithium cells) in WEEE (kg/T)
Type/category of WEEE			
Temperature exchange equipment	Cooling & freezing appliances	1B	0
Screens, monitors, and equipment containing screens having a surface greater than 100 cm²	Only screens & monitors; equipment containing screens having a surface greater than 100 cm² are part of the fraction 'OVE' (small appliances) of Recupel	3B, 4B	0,0002271
Lamps	Gas discharge lamps	5a	0
Large equipment household appliances; IT and telecommunication equipment; consumer equipment; luminaires; equipment reproducing sound or images, musical equipment; electrical and electronic tools; toys, leisure and sports equipment; medical devices; monitoring and control instruments; automatic dispensers; equipment for the generation of electric currents.	Only large household appliances were considered. All the other appliances are part of the next category.	1A	0
Small equipment household appliances; consumer equipment; luminaires; equipment reproducing sound or images, musical equipment; electrical and electronic tools; toys, leisure and sports equipment; medical devices; monitoring and control instruments; automatic dispensers; equipment for the generation of electric currents.	All the other large equipment out of the previous category (that weren't considered) are part of this category. In daily practise the appliances are collected together with small IT and telecomunication equipment.	1,2,4A,5,6,7,8,9	0,0984

Small IT and telecommunication equipment (no external dimension more than 50 cm)		3A	4,5495

Additional information:

Since 2014 Recupel measures the quantity of lithium batteries in the OVE-fraction (= mix of category 1,2, 3, 4, 5, 6, 7, 8 and 9) by sampling.
per transport (24boxes)
In average about 7kg of lithium batteries per transport (in average
about 7500kg) were found, the minimum amount was less than a kilogram en the maximum
amount about 26kg.
Based on that data small household appliances contain on average 0,9295 kg/T lithiumbatteries.
The minimum value measured is 0,0982 kg/T and the maximum value is 3,5297 kg/T.

Function: (main)power source or support/backup	Mass(g)	nominal energy (Wh)	Lithium content (g)	Remarks
n.a.	n.a.	n.a.	n.a.	Based on information from Recupels treatment operators.
support/backup	9	4,32	0,3	Rough estimation of one of our treatment partners. Li-batteries are mostly present in Imacs. Only small amount is present, therefore difficult to determine representative data.
n.a.	n.a.	n.a.	n.a.	Information from report recycler lamps Indaver
n.a.	n.a.	n.a.	n.a.	Rough estimation based on a small analysis of the OVE Fraction. Only small amount (8,04 T) was analysed, therefore data are only an indication, not representative. Lithium content wasn't indicated on the battery so no information is known based on the analysis.
94,4 % Main power source, 5,6 % support, 0 % backup	36	16,85	not known	

71,7 % Main power source, 26,7 % support, 1,7% backup	108,279	14,8875	not known	

Findings
of
ZVEI (German Electrical and Electronic Manufacturers' Association) and
BITKOM. (Federal Association for Information Technology, Telecommunications and New Media)
regarding the Questionnaire of the informal working group on the transport of WEEE containing lithium batteries

1. Introduction:
Waste electrical and electronic equipment containing lithium batteries is subject to dangerous goods provisions. In order to make the collection and carriage of waste electrical and electronic equipment practicable and safe, the Joint Meeting is currently addressing the question as to whether the existing provisions should be updated. An informal working group of the Joint Meeting has met in this connection. One of the results of this meeting was that the question as to whether there should be additional facilitations for the carriage of WEEE should be considered further. For instance, large household appliances with a small backup battery (e.g. washing machine with a button cell) or lots of electrical and electronic equipment containing only a minimal percentage of lithium batteries are also subject to dangerous goods provisions. In order to be able to make statements about possible risks, information about the type and amount of the batteries used in different types of equipment is needed as a basis for further discussion.
The industry concerned is therefore asked to provide information about lithium batteries in WEEE, if possible. This information is to be entered in the matrix below.

2. Matrix

Information on contained lithium batteries/cells in WEEE / **Type/category of WEEE[1]**	**Further specification of WEEE, if applicable[2]**	**Share of lithium batteries (including lithium cells) in WEEE[3]**	**Function: (main)power source or support/backup**	**Mass (g)/ Nominal energy (Wh)/ Lithium content (g)**	**Remarks**
Temperature exchange equipment	Appliances with cable (in very rare cases lithium battery for backup purposes)	<< 0,001%		Possible Type CR 2032: Mass 3 g, Nominal energy 230 mAh, Lithium content 0,07 g	Maybe backup-function in very rare cases

Information on contained lithium batteries/cells in WEEE Type/category of WEEE[1]	Further specification of WEEE, if applicable[2]	Share of lithium batteries (including lithium cells) in WEEE[3]	Function: (main)power source or support/backup	Mass (g)/ Nominal energy (Wh)/ Lithium content (g)	Remarks
Screens, monitors, and equipment containing screens having a surface greater than 100 cm²	Appliances without cable (lithium battery as **main power source),** (laptops, tablets, large smartphones)	0,9% (e. g. 9 kg Lithium batteries in 1 t of WEEE)	Lithium battery as main power source	100 … 300 g 15 … 45 Wh	Share of lithium batteries is valid for a realistic mixture of "Screens, monitors, and…"; E. g. tablets as a singular fraction contain about 25% lithium batteries.
	Appliances with cable (lithium battery only for **backup** purposes (TVs and Monitors)	0,0025% (e. g. 25 g Lithium batteries in 1 t of WEEE)	Backup only	Possible Type CR 2032: Mass 3 g, Nominal energy 230 mAh, Lithium content 0,07 g	Modern TV-sets or monitors do not need a backup battery anymore as the storage capabilities are based on special memory chips
Lamps	No batteries applied	0,0%	--	--	

Information on contained lithium batteries/cells in WEEE Type/category of WEEE[1]	Further specification of WEEE, if applicable[2]	Share of lithium batteries (including lithium cells) in WEEE[3]	Function: (main)power source or support/backup	Mass (g)/ Nominal energy (Wh)/ Lithium content (g)	Remarks
Large equipment Household appliances; IT and telecommunication equipment; consumer equipment; luminaires; equipment reproducing sound or images, musical equipment; electrical and electronic tools; toys, leisure and sports equipment; medical devices; monitoring and control instruments; automatic dispensers; equipment for the generation of electric currents. (Other than No. 1 to 3)	Appliances without cable (lithium battery as **main power source** (large gardening equipment)	0,05% (e. g. 0,5 kg Lithium batteries in 1 t of WEEE)	Lithium battery as main power source	10…**200**…(3000) g 50 … 200 Wh	Share of lithium batteries is valid for a realistic mixture of “Large equipment”; E. g. large gardening equipment as a singular fraction may contain more lithium batteries.
	Appliances with cable (lithium battery only for **backup** purposes)	0,001% (e. g. 10 g Lithium batteries in 1 t of WEEE)	Backup only	Possible Type CR 2032: Mass 3 g, Nominal energy 230 mAh, Lithium content 0,07 g	

Information on contained lithium batteries/cells in WEEE Type/category of WEEE[1]	Further specification of WEEE, if applicable[2]	Share of lithium batteries (including lithium cells) in WEEE[3]	Function: (main)power source or support/backup	Mass (g)/ Nominal energy (Wh)/ Lithium content (g)	Remarks
Small equipment Household appliances; consumer equipment; luminaires; equipment reproducing sound or images, musical equipment; electrical and electronic tools; toys, leisure and sports equipment; medical devices; monitoring and control instruments; automatic dispensers; equipment for the generation of electric currents. (Other than No 1 to 3 and 6).	Appliances without cable (lithium battery as **main power** source) Appliances with cable (lithium battery only for **backup** purposes)	0,8% (e. g. 8 kg Lithium batteries in 1 t of WEEE) 0,003% (e. g. 30 g Lithium batteries in 1 t of WEEE)	Lithium battery as main power source Only backup-function	10…**50**…(1000) g 10…**70**… (200) Wh Typical Type CR 2032: Mass 3 g, Nominal energy 230 mAh, Lithium content 0,07 g	

Information on contained lithium batteries/cells in WEEE / Type/category of WEEE[1]	Further specification of WEEE, if applicable[2]	Share of lithium batteries (including lithium cells) in WEEE[3]	Function: (main)power source or support/backup	Mass (g)/ Nominal energy (Wh)/ Lithium content (g)	Remarks
Small IT and telecommunication equipment (no external dimension more than 50 cm)	Appliances without cable (lithium battery as **main power** source, e. g. smart phones)	0,8% (e. g. 8 kg Lithium batteries in 1 t of WEEE)	Lithium battery as main power source	3 … 100 g 1 … 10 Wh	Share of lithium batteries is valid for a realistic mixture of "Small IT and telecommunication equipment"; Smartphones as a singular fraction contain about 30% lithium batteries.
	Appliances with cable (lithium battery only for **backup** purposes), e.g. some printers)	0,004% (e. g. 40 g Lithium batteries in 1 t of WEEE)	Only backup-function	Typical Type CR 2032: Mass 3 g, Nominal energy 230 mAh, Lithium content 0,07 g	

2016-01-18

[1] The categories correspond to the categories as defined in Annex III of Directive 2012/19/EU on waste electrical and electronic equipment (WEEE). When the information on batteries/cells refers only to parts of the described category, specify further.

[2] Indicate if the relevant group does not correspond to the WEEE category as described in column 1 (e.g. due to national collection regimes) and describe further, e.g. function of the appliances

[3] Indicate reference parameters, e.g. kg of lithium batteries per t of WEEE.

Information über Lithium-Batterien/Zellen in Elektroaltgeräten	Anteil von Lithium-Batterien (einschließtlich Lithium-Zellen) in EAG (Gewicht) gemessen am Gesamtgewicht der Geräte [1]	Funktion der Batterien: hauptsächliche Energiequelle oder Stützbatterie (=Knopfzelle)	Gewicht (g)/Nominelle Energie (Wh)/Lithium Anteil (g)	Bemerkungen
Sammelgruppe 1	< 1 bis 0,1 %	Stützbatterie	5 g, 48 – 500 mAh, Li ?	
Sammelgruppe 2	< 1 bis 0,1 %	Stützbatterie	5 g, 45 – 1000 mAh, Li ?	

Soweit möglich, sollte in den Sammelgruppen noch nach Geräteart (etwa Waschmaschinen, Herd, etc.) spezifiziert werden:

Sammelgruppe 1

Geräteart (s. Anlage 1 zu § 2 Abs. 1 ElektroG)	Anteil von Lithium-Batterien (einschließtlich Lithium-Zellen) in EAG (Gewicht) gemessen am Gesamtgewicht der spezifischen Geräteart	Funktion der Batterie: hauptsächliche Energiequelle oder Stützbatterie (=Knopfzelle)	Gewicht (g)/Nominelle Energie (Wh)/Lithium Anteil (g)	Bemerkungen
Waschmaschine	< 0,1 %	Stützbatterie	5g, 3V, 280 mAh	
Wäschetrockner	-			
Geschirrspüler	-			
Herde und –backöfen	< 0,1 %	Stützbatterie	5g, 3V, 500 mAh	
Elektrische Kochplatten	-			
Elektrische Heizplatten	-			
Mikrowellengeräte	-			
Sonstige Großgeräte zum Kochen oder zur sonstigen				

[1] Hier sollte das Gesamtgewicht der Geräte, die im Container enthalten sind, aufgenommen werden und das Gewicht der Lithium-Batterien (Li-Ion-Batterien und Li-Metall-Batterien), die in den Geräten enthalten sind.

Verarbeitung von Lebensmitteln				
Elektrische Heizgeräte	-			
Elektrische Heizkörper	-			
Sonstige Großgeräte zum Beheizen von Räumen, Betten und Sitzmöbeln	-			
Nachtspeicherheizgeräte	-			
Elektrische Ventilatoren	-			
Sonstige Belüftungs-, Entlüftungs- und Klimatisierungsgeräte	-			
Ausgabeautomaten	< 1%	Stützbatterie	5g, 620-950 mAh	
Sonstige:				

Dasselbe für Sammelgruppe 2

Geräteart	Anteil von Lithium-Batterien (einschließtlich Lithium-Zellen) in EAG (Gewicht) gemessen am Gesamtgewicht der spezifischen Geräteart	Funktion der Batterie: hauptsächliche Energiequelle oder Stützbatterie (=Knopfzelle)	Gewicht (g)/Nominelle Energie (Wh)/Lithium Anteil (g)	Bemerkungen
Große Kühlgeräte				
Kühlschränke	-			
Gefriergeräte	-			
Ölgefüllte Radiatoren	-			
Klimageräte	< 1%	Stützbatterie	5g, 48 – 650 mAh	
Sonstiges Großgeräte zur Kühlung von Lebensmitteln				
Sonstige				

Schwan, Gudula

Von: Ewelina Bugajski <bugajski@metallhandel-online.com>
Gesendet: Dienstag, 1. März 2016 15:22
An: Schwan, Gudula
Betreff: AW: Informationen zum Anteil von Lithiumbatterien in EAG
Anlagen: Kopie von Batterien in SG3-SG5 alt-VDM - anonym.xlsx

Sehr geehrte Frau Schwan,

eines unserer Mitgliedsunternehmen hat sich die Mühe gemacht und 10 Container nach Knopfzellen der „weißen Ware“ **Sammelgruppe 1 und 2** durchzuschauen. Hier konnte nur keine Knopfzelle gefunden werden. Nach Aussage des Unternehmens, ist der Rücklauf von zum Beispiel Kühlschränken mit Lithium-Knopfzellen derzeit fast nicht vorhanden. Geräte die mit Lithium-Knopfzellen hergestellt werden, kommen erst jetzt auf den Markt. Bis ein Rücklauf dieser Geräte ins Recycling stattfindet, wird das 8 bis 10 Jahre (Lebensdauer eines Gerätes) benötigen. Als Anlage erhalten Sie zudem die Auswertung für die Sammelgruppen 3 und 5. Auch hier wurden 12 bzw. 13 Container untersucht. Die Menge an Knopfzellen pro Container beträgt

für **Sammelgruppe 5 (alt)** 122,8g und

für **Sammelgruppe 3 (alt)** 95,4g.

Auch hier ist die Menge an Knopfzellen gering. Weitere Detail entnehmen Sie bitte der Excel-Datei.

Durch die Änderung der Sammelgruppen sind keine relevanten Veränderungen in der Anzahl der pro Container enthaltenen Lithium Batterien zu erwarten. SG 5 neu wird zu ca. jeweils 50 % aus SG 3 alt ohne Bildschirmgeräte und SG 5 alt bestehen.

Mit freundlichen Grüßen

Ewelina Bugajski
Umwelt & Recycling
Environment & Recycling

Verband Deutscher Metallhändler e.V.

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10969 Berlin

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E-Mail: bugajski@vdm.berlin
www.vdm.berlin

Von: Schwan, Gudula [mailto:gudula.schwan@bmvi.bund.de]
Gesendet: Mittwoch, 18. November 2015 16:50
An: 'bugajski@vdm.berlin'; 'Giefer, Cornelius'
Cc: 'Neubauer, Alexander'; 'frank.krischok@bam.de'; 'Neubauer, Alexander'
Betreff: Informationen zum Anteil von Lithiumbatterien in EAG

Sehr geehrte Frau Bugajski, sehr geehrter Herr Giefer,
bei der AG Lithiumbatterien und elektrische Speicher hatten wir über das Ergebnis der AG der Gemeinsamen Tagung zum Thema Lithiumbatterien in EAG und die Bitte um weitere Informationen aus der betroffenen Wirtschaft

gesprochen. Neben dem VKU hatten auch Sie angeboten, sich seitens Ihrer Mitgliedsunternehmen um entsprechende Informationen zu bemühen.
Herr Neubauer hat den Fragebogen, wie in Annex 2 des Inf. 13 Dokuments enthalten, für seine Mitgliedsunternehmen in eine deutsche Matrix umgewandelt.
Vielleicht ist seine Matrix auch für Sie hilfreich.

Mit freundlichen Grüßen

Gudula Schwan

Bundesministerium für Verkehr und digitale Infrastruktur
Ref. G 24- Beförderung gefährlicher Güter
Postfach 20 01 00, D-53170 Bonn

Federal Ministry of Transport and digital Infrastructure
Division G 24 - Transport of Dangerous Goods
P.O. Box 20 01 00, D 53170 Bonn

Tel. +49 (0) 228 300 2551

Januar 2016				
Sortierung SG 5 alt		13	Container	
		5.589,62	kg/Container	
	kg		%	
Gesamtliefermenge		72.665,0		100,000
Geräte mit Batt/Akku		6.028,0		8,296
Batterien, Akkus		482,0		0,663
davon:				
LI-Ionen		46,0		0,063
Gerätebatterien		436,0		0,600
Darin enthalten:				
Knopfzellen Li		1,6		0,002
	Stck.		g/Stck.	
Knopfzellen Li		571		2,80
Knopfzellen pro Container		43,9	Stck.	
Knopfzellen pro Container		122,8	g	

Januar 2016				
Sortierung SG 3 alt ohne		12	Container	
Bildschirmgeräte		5.468	kg/Container	
	kg		%	
Gesamtliefermenge		65.615,0		90,298
Geräte mit Batt/Akku		4.558,0		6,273
Batterien, Akkus		261,0		0,359
davon:				
LI-Ionen		46,0		0,063
Gerätebatterien		215,0		0,296
Darin enthalten:				
Knopfzellen Li		1,1		0,002
	Stck.		g/Stck.	
Knopfzellen Li		406		2,82
Knopfzellen pro Container		33,8	Stck.	
Knopfzellen pro Container		95,4	g	

bifa Umweltinstitut

Ergebnisbericht

Projekttitel

Untersuchung von gebrauchten Haushaltsgroßgeräten (ElektroG Gruppe 1) auf Lithiumbatterien -

Auftraggeber

Abfallwirtschafts- und Stadtreinigungsbetrieb der Stadt Augsburg (aws)

Projekt-Nr.

930513 - 14

Bearbeiter

Hermann Nordsieck

Roland Schipf

Markus Hertel

Augsburg, 10.03.2016

INHALTSVERZEICHNIS

1 Veranlassung

Der Transport von Lithiumbatterien unterliegt dem Gefahrgutrecht. Daher müssen diese in Deutschland entweder nach den Vorgaben des ADR transportiert werden oder die Transporte bedürfen einer Einzelgenehmigung. Nach den Vorgaben des ADR dürfen Lithiumbatterien (UN-Nummern 3090, 3091, 3480, 3481) nur transportiert werden, wenn die Bedingungen verschiedener Sondervorschriften eingehalten werden. Den Transport gebrauchter Lithiumbatterien, deren Zustand unbekannt ist, regelt die Sondervorschrift (SV) 636. Diese sieht u.a. vor, dass

- das Gewicht der einzelnen Batterie unter 500 g liegt,
- die Batterien entsprechend der Verpackungsanweisung P909 in der Regel in geeignete Verpackungen verpackt werden,
- nach P909 kann auf eine Verpackung verzichtet werden, wenn in Ausrüstungen (Geräte) eingebaute Batterien durch die Ausrüstung hinreichend geschützt sind (und die Ausrüstungen verpackt werden),
- „große“ Ausrüstungen mit Lithiumbatterien unverpackt transportiert werden dürfen,
- ein Qualitätssicherungssystem besteht, mit dem das Einhalten der übrigen Bedingungen gesichert wird.

In Haushaltsgroßgeräten wie Mikrowellengeräten, Herden, Waschmaschinen oder Wäschetrocknern könnten zum Erhalt von Informationen zum Programmablauf Lithiumbatterien als sogenannte Stützbatterien eingebaut sein.

Um zu klären, ob das in den derzeit anfallenden Elektroaltgeräten der Gruppe 1 nach ElektroG der Fall ist, beauftragte der Abfallwirtschafts- und Stadtreinigungsbetrieb der Stadt Augsburg das bifa Umweltinstitut mit der Untersuchung einer Stichprobe aus der Haushaltsgroßgerätesammlung in Augsburg.

2 Durchführung

Im Zeitraum zwischen 17.02.2016 und 19.02.2016 wurde der Inhalt von zwei Abrollcontainern (40 m³ Nenninhalt) untersucht, die mit Elektroaltgeräten aus der Haushaltsgroßgerätesammlung (Gruppe 1) beladen waren.

Die Container stammten von zwei der vier Wertstoff- und Servicepunkten in Augsburg. Sie enthielten insgesamt 155 Geräte mit einer Gesamtmasse von 5.340 kg.

Zur Untersuchung wurden die Geräte ausgeladen und Geräteart, Hersteller, Typenbezeichnung und, soweit möglich, das Baujahr bestimmt. Der äußere Zustand sämtlicher Geräte wurde fotografisch dokumentiert.

Bei den Geräten, die über eine elektronische Anzeige für Zeit, Temperatur, Programmfortschritt oder ähnlichem verfügten, wurde angenommen, dass sie eine elektronische Steuerung haben und somit Lithium-Batterien enthalten könnten. Die Steuerung dieser Geräte wurde ausgebaut und geprüft, ob sie tatsächlich Lithiumbatterien enthält.

3 Ergebnisse

3.1 Charakterisierung der Geräte

Geräteart

Unter den untersuchten Geräten am zahlreichsten vertreten waren Waschmaschinen mit einem Anteil von 23 % (35 Stück). Häufig traten auch Mikrowellengeräte und Spülmaschinen mit Anteilen von je 15 % (24 bzw. 23 Stück) auf. Daneben waren Herdplatten bzw. Kochfelder, Wäschetrockner und Backöfen mit Stückzahlen über 10 Stück vertreten. Seltener traten Dunstabzugshauben (6 %), Tischgrills (3%) und Heißwassergeräte bzw. Elektroboiler mit jeweils 2 % der Gesamtzahl auf. Vereinzelt waren Wäscheschleudern und Heizgeräte aufzufinden. Als Fehlwürfe müssen der Anteil an Kühlschränken (ElektroG Gruppe 2), Haushaltskleingeräte (Gruppe 3) und ein Seitenkanalgebläse, das als gewerblich zu nutzendes Gerät dem B2B-Bereich zuzuordnen wäre, angesehen werden. Die Häufigkeiten der Gerätearten sind in Abbildung 1 dargestellt.

Das aus der Anzahl der Geräte und der Gesamtmasse berechnete mittlere Gewicht betrug 34,5 kg/Stück.

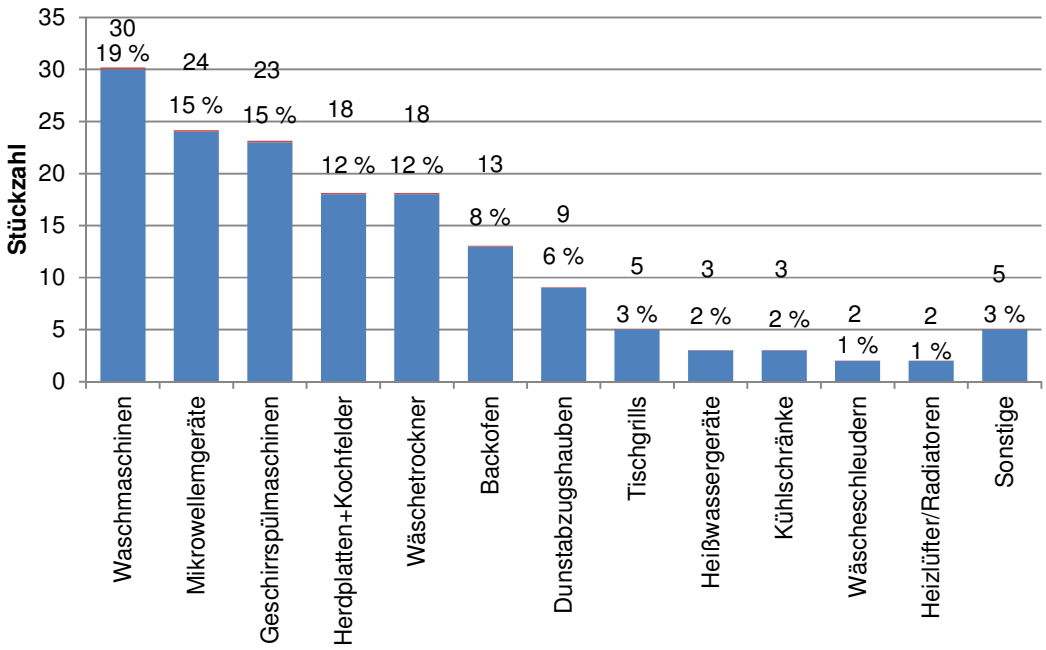

Abbildung 1: Häufigkeit der Gerätearten

Alter der Geräte

Auf den Typenschildern waren nur vereinzelt Angaben zum Baujahr zu entziffern. Teilweise fehlten Typenschilder ganz und häufig war es so unleserlich, dass es nicht entziffert werden konnte. Dem Erscheinungsbild zufolge stammten die meisten Geräte (mehr als 2/3) aus dem Zeitbereich zwischen etwa 1990 und etwa 2010. Jüngere Geräte waren selten, hier ist als Beispiel ein zerbrochenes Induktionskochfeld zu nennen, das auf 2013 datiert werden konnte. Ein Untertischboiler stammte dem Typenschild zufolge aus dem Jahr 2012. Relativ viele Geräte stammten aus dem Zeitbereich zwischen etwa 1970 und 1990.

Zustand der Geräte

Der überwiegende Teil der Geräte wies keine oder nur oberflächliche Schäden wie Kratzer oder leichte Beulen auf. Ein Anteil von 10 % der Geräte war teilweise oder tiefgreifend demontiert, so dass Teile wie Motoren, Steuerungen oder mit Werkzeug abzuschraubende Gehäuseteile fehlten. Diese Beschädigungen sind nicht der Sammlung oder dem Transport zuzuordnen. Schäden, wie sie typischerweise beim Transport auftreten, wie starke Beulen oder Risse im Gehäuse oder zerbrochene Gehäuseteile waren bei 9 % der Geräte festzustellen. Die Ergebnisse der Untersuchung auf Beschädigung sind in Tabelle 1 zusamengefasst.

Bei den Geräten, die über eine elektronische Steuerung verfügten und diese zur Untersuchung demontiert wurde, war festzustellen, dass die Steuerung in der Regel ein eigenes Gehäuse hatte (Berührungs- und Feuchtigkeitsschutz). Diese Gehäuse waren in allen Fällen nicht beschädigt.

Tabelle 1: Beschädigungsgrad der untersuchten Geräte

Zeile	Art der Beschädigung	Anzahl	Anteil
1	nicht oder nur oberflächlich beschädigte Geräte	16	10 %
2	Schäden durch Demontage	16	10 %
3	starke Beulen und /oder zerbrochene Gehäuseteile	14	9 %
4	fehlende Teile (Geräte aus Zeile 2 und 3)	26	17 %

3.2 Geräte mit Lithiumbatterien

Ein Anteil von 23 % der Geräte (35 Stück) hatte eine elektronische Anzeige für Uhrzeit, Temperatur, Programmfortschritt oder ähnliches. Die Untersuchung der Steuerungen dieser Geräte zeigt, dass keines der Geräte eine Lithium-Stützbatterie enthielt.

Bei Geräten mit mechanischer Programmablaufsteuerung kann das Vorhandensein einer Stützbatterie ausgeschlossen werden. Diese Einschätzung wurde von einem Elektro-Fachbetrieb, bei dem seit langem Haushaltsgroßgeräte repariert werden, bestätigt (Zimmerly Elektro GmbH, Augsburg).

4 Fazit

Anhand einer Stichprobe aus zwei umfangreichen Teilproben der Gruppe 1 aus der Elektroaltgerätesammlung des Abfallwirtschafts- und Stadtreinigungsbetriebs der Stadt Augsburg wurde geprüft, ob im Sammelgut Lithiumbatterien zu erwarten sind.

Dabei wurden 155 Geräte im Gesamtgewicht von 5.340 kg nach Geräteart und Art der Steuerung sortiert. Weil bei Geräten mit elektromechanischer Steuerung das Vorkommen von Lithiumstützbatterien ausgeschlossen werden kann, wurden von allen Geräten mit elektronischer Steuerung die Steuerung demontiert und auf das Vorhandensein von Lithiumbatterien untersucht. Im untersuchten Sammelgut waren keine Lithiumbatterien enthalten.

Neben der Untersuchung auf Lithiumbatterien wurde geprüft, ob und in wie weit die Geräte bei der Sammlung und beim Transport in einem Abrollcontainer mit Auf- und Abladevorgang beschädigt werden. Der überwiegende Teil der Geräte (81 %) war bis auf Kratzer, Korrosionsschäden und oberflächliche Beulen nicht sichtbar beschädigt. Der Anteil von Geräten, die eindeutig vor der Sammlung durch Demontage von Bauteilen beschädigt wurden, war mit 10 % höher als der Anteil von Geräten, die möglicherweise transportbedingt starke Beulen hatten oder bei denen Gehäuseteile gebrochen waren. Die Steuerungen der Geräte waren durchweg mechanisch nicht beschädigt. Daraus kann abgeleitet werden, dass eventuell in Elektrogroßgeräte verbaute Lithiumbatterien durch die Gehäuse vor Beschädigung und Kurzschluss ebenso gut wie durch eine hochwertige Verpackung geschützt werden.

Answer from EES-Ringus

Schwan, Gudula

Von: Lucia Herreras <lucia.herreras@weee-forum.org>
Gesendet: Montag, 8. Februar 2016 16:50
An: Schwan, Gudula
Cc: Pascal Leroy
Betreff: ADR survey

Dear Gudula,

I hope this e-mail finds you well. As requested, we have asked our members to contribute to the ADR survey you are conducting. Some of them have contacted you directly I believe, and some have come back to us. In some cases I am afraid that the form provided was not used. You will find below the reply from our Estonian member. The reply from the Portuguese one will follow in a separate mail.

I hope this information is helpful.
Kind regards,

Lucía Herreras Martínez
Technical Manager

weeeforum
EUROPEAN ASSOCIATION OF ELECTRICAL AND ELECTRONIC WASTE TAKE BACK SYSTEMS

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From: Hans Talgre [mailto:hans.talgre@eesringlus.ee]
Sent: Thursday, December 10, 2015 14:59
To: Lucia Herreras <lucia.herreras@weee-forum.org>
Subject: RE: ADR updates (Nov 2015) - action required (deadline February 2016) [New comment]

Dear Lucia,

It is difficult to fill out this questionary. Info what I can provide is:

- Before WEEE is going to the (pre)treatment, all (100%) batteries are removed from WEEE and are treated separately according to the battery directive.

- Unfortunately removed batteries are collected as Mix batteries, so we do not know how much there where Li-ion, Lithium, Alkaline … batteries in WEEE. All batteries from WEEE and from shops are sorted together.
- According to our batch in 2013 (SHA, Small IT and other consumer equipment) there was only 0,5% (average) of batteries from total input. This % varies time to time, because it depends how much (or what is the share) different types of equipment is in batch.
- BAtches in detailed: SHA – 0,148 % of batteries from total input, Computers (all kind) – 1,075 % of batteries form total input and small consumer equipment – 0,08 % of batteries from total input.

EES-Ringlus is collecting batteries from shops aswell and there is only 1% of Button cells and 3% of Li-Ion batteries. So I estimate that quantities in WEEE are very very small.
I hope this information help a little bit
Regards,

Hans Talgre
EES-Ringlus

From: Pascal Leroy [mailto:lucia.herreras@weee-forum.org]
Sent: Tuesday, December 01, 2015 4:19 PM
To: hans.talgre@eesringlus.ee
Subject: RE: ADR updates (Nov 2015) - action required (deadline February 2016) [New comment]

This message goes to WG Collection, WG Operations and to individuals who expressed an interest in Collection

Dear All,

Please find below an e-mail we received regarding this issue. We kindly ask you to take it into acccount before preparing the survey responses.

Regards, Lucía.

Orgalime, CECED, DIGITALEUROPE, RECHARGE and WEEE Forum have been contacted by the informal working group on the transport of WEEE containing lithium batteries (see previous mail here) with a request to completea questionnaire aimed at collecting information about the amount and type of batteries in EEE.

To avoid possible misunderstandings how to interpret the questions and how to fill in the questionnaire I would like to share some thoughts I exchanged with Ms Schwan from the informal working group:
• The questionnaire addresses as well
  o lithium-ion-accumulators (as in notebooks, smartphones or power-tools etc.) as well as
  o lithium-metal-batteries or button cells (mostly used as back-up batteries or as main power source e. g. for watches etc.). (<- The stress is on the button cells!)
• As the total weight of both categories of batteries is totally different (ZVEI und Bitkom expect (a) 40 … 100 g button-cells vs. (b) around 50 kg accumulators per container (30 m³)) they must be addressed separately:
  o Therefore the column “Further specification of WEEE, if applicable” corresponding with the column
  o “Function: (main)power source or support/backup” is very important:
The different product groups containing different types of batteries should be named there
  - e. g. notebooks, smartphones or power-tools - Function: (main)power source
  - e. g. desktops or other equipment - Function: support/backup
• In the column “Mass (g)/ Nominal energy (Wh)/Lithium content (g)”
  o the most important information is “Mass (g)” whereas
  o Nominal energy (Wh)/ and Lithium content (g) might be derived from average figures.

I hope this information is useful for you. In addition ZVEI and Bitkom will reshuffle their own figures according to the questionnaire of the UNECE informal working group. If you are interested we can pass this information to you.

Mit freundlichem Gruß / Kind regards

Otmar Frey
Geschäftsführer Fachverband Batterien / Managing Director Batteries Division
Leiter der Abteilung Umweltschutzpolitik / Head of Environmental Policy Department

ZVEI - Zentralverband Elektrotechnik- und Elektronikindustrie e. V.
German Electrical and Electronic Manufacturers´ Association
Fachverband Batterien, Abteilung Umweltschutzpolitik
Lyoner Straße 9 • 60528 Frankfurt am Main • Germany

Lucía Herreras - 01/12/2015 15:19

Dear all,

please find below the e-mail we have received from the ADR WG. May I kindly ask you to send us (lucia.herreras@weee-forum.org) your responses by mid February 2016? . You will find the questionnaire attached at the end of this e-mail and a report explaining the current situation on ADR WG decisions.

Thank you very much in advance.

Kind regards,

Lucía

Dear Sir, Madam,
I contact you on behalf of the informal working group on the transport of WEEE containing lithium batteries in order to see if your association can provide some information to support the discussion on the transport provisions for WEEE.

The informal working group was established by the Joint Meeting of the RID Committee of Experts and the Working Party on the Transport of Dangerous Goods, which is responsible for the development of the provisions on transport of dangerous goods in European land transport (ADR and RID). The current provisions of ADR/RID have special provisions for the collection and transport of lithium batteries (in particular special provision 636) which are also applicable to the transport of electronic and electronical waste containing lithium batteries. However, it was found that some amendments are necessary to meet the special needs of transport of WEEE in Europe as required by directive 2012/19/EU and the informal working group was instructed to review the existing requirements. Enclosed you find a report of the working groups meeting in June.

One finding of the group was, that ADR/RID provisions are mainly applied to types of equipment that typically contain lithium batteries or contain larger percentages of lithium batteries. Other appliances such as screens or large household appliances (e. g washing machines) are often treated as if they generally did not contain lithium batteries without any validation of their composition. In this context it was discussed whether a lower threshold limit of lithium batteries in WEEE below which facilitations for carriage of equipment could be granted. However, in order to be able to draw conclusions regarding possible risks, further information about the type and amount of the batteries used in different types of equipment has to be obtained from the industry. For this purpose a questionnaire was drawn up (Annex II of the report of the working group) and several associations that could assist and should have relevant information were identified (paragraph 46 of the report of the working group).

Therefore I hope that your association can help us with some information on the content of lithium batteries, either on the basis of existing information or on the basis of investigations e.g. at intermediate facilities.

The questionnaire is additionally attached in a word format. It follows the categories as defined in the WEEE directive as a guideline, but the type of WEEE may be individually specified in the second column. One question was also if some types of devices only contain small button cells which serve only as support or backup, thus the column “Function:(main)power source or support/backup” has been included in the questionnaire.

If possible, the questionnaire should not be answered by individual undertakings but in a coordinated manner by the relevant associations.

In order to be able to consider this during the next Joint Meeting in March 2016, you are kindly asked to answer till 29th of February 2016.

If you have any further questions, do not hesitate to contact me.

Kind regards

Gudula Schwan

Bundesministerium für Verkehr und digitale Infrastruktur
Ref. G 24- Beförderung gefährlicher Güter
Postfach 20 01 00, D-53170 Bonn

Federal Ministry of Transport and digital Infrastructure
Division G 24 - Transport of Dangerous Goods

Answer from VKU Germany

Translation

Dear Ms Schwan,

With a view to the working group meeting that will take place next week, please find enclosed initial results of the sorting tests for waste electrical and electronic equipment of collection group 5 (small household appliances, IT and telecommunications equipment, consumer equipment, lamps and lighting equipment as well as equipment for the purpose of spreading or controlling light, electrical and electronic tools, toys, leisure and sports equipment, medical devices, monitoring and control instruments). These results are based on a first sample (nearly 1 Mg) of waste electrical and electronic equipment of group 5 handed in to a recycling centre; the sorting test was intended to find out how many lithium batteries there are in the entire collection group 5 with no difference being made yet between equipment in the bulk collection and the sub-collection group “battery-powered equipment”.

Another sample will be evaluated shortly to provide a wider foundation. Here, it will also be analysed how many batteries, in particular lithium-ion batteries, actually remain in the bulk collection after citizens have placed the battery-powered equipment into separate containers at the recycling centres. As this analysis is slightly delayed, I have to hand it in later (probably in the first week in May). Even if we do not yet have concrete figures, the VKU ElektroG working group is of the unanimous opinion that even if a sub-collection group “battery-powered equipment” was created, a completely battery-free bulk collection could not be achieved and there will be further admixture of other materials by mistake in the bulk collection. For this reason, VKU urgently recommends to lay down a tolerance on the amount or concentration of lithium batteries in waste electrical or electronic equipment that may be carried in bulk. For this, an analysis of the various sorting results has to be performed.

Yours sincerely,

Alexander Neubauer

Sorting sample collection group 5 in accordance with the ElektroG (electrical and electronic equipment act) (complete collection group), equipment from recycling centre:

	kg	**%**
Total equipment collection group 5	965.00	
Battery weight	8.26	0.86 %
Normal batteries	4.76	0.50 %
Lithium-ion batteries	3.5	0.36 %