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Acronyms

BBP	Benzyl butyl phthalate
CEN	European commission of standardization
D	Deliverable
DEHP	bis(2-ethylhexyl) phthalate
DBP	benzyl butyl
DG	Directorate-General for Environment
DIBP	Diisobutyl phthalate
EC	European Commission
EASME	European Agency for Small and Medium Enterprises
EU	European Union
H2020	Horizon 2020
PVC	Polyvinyl chloride
ISO	International Organization for Standardization
WP	Work Package

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History of changes

Version	Author	Date	Comments
0.1	Ingmar Drost	08-11-2019	
0.2	Jan Diemert, Fraunhofer ICT	14-11-19	Revised Structure
0.3	Mathilde Fiorletta, VERTECH Group	25-11-2019	Review of content
0.4	Ingmar Drost	02-12-2019	Resolving comments
1.0	Guy Buyle	11-12-2019	Finalised

Introduction

This document is meant to describe the standardization landscape that may be applicable to the REMADYL project. This analysis starts with the identification of the standards and legislations that may be applied to the process for the management, transport and handling of the substances used or treated during the process. The legislation applicable to recycled PVC, the legacy additives, the used technology and safely handling of materials will be reviewed. This review of applicable regulations will be updated on a six-monthly basis to ensure the consortium is aware of latest developments. This document is a screening of the standards and legislations REMADYL may be required to be compliant to.

1 Definition

Before analysing specific standardization and legislations, hereby a short description of the main type of standards and legislations analysed.

- ISO:(the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. (ISO, 2019)
- **CEN**, the European Committee for Standardization, is an association that brings together the National Standardization Bodies of 34 European countries. CEN is one of three European Standardization Organizations (together with CENELEC and ETSI) that have been officially recognized by the European Union and by the European Free Trade Association (EFTA) as being responsible for developing and defining voluntary standards at European level. The scope of this review does not include the standardization of the CENELEC & ETSI. The CENELEC is a European committee for electrotechnical standardization, where the ETSI is an organization to provide an environment for timely development, ratification and testing of globally applicable standards for ICT-enabled systems, applications and services. These are not applicable to the REMADYL project. CEN provides a platform for the development of European Standards and other technical documents in relation to various kinds of products, materials, services and processes. CEN supports standardization activities in relation to a wide range of fields and sectors including: air and space, chemicals, construction, consumer products, defence and security, energy, the

environment, food and feed, health and safety, healthcare, ICT, machinery, materials, pressure equipment, services, smart living, transport and packaging. (CEN, 2019)

- European Directives: A "directive" is a legislative act that sets out a goal that all EU countries must achieve. However, it is up to the individual countries to devise their own laws on how to reach these goals.

2 Chemicals used in REMADYL project

Figure 1 is simplified flowchart of the REMADYL extrusion process in which is visualized how the collected PVC scrap is processed and recycled.

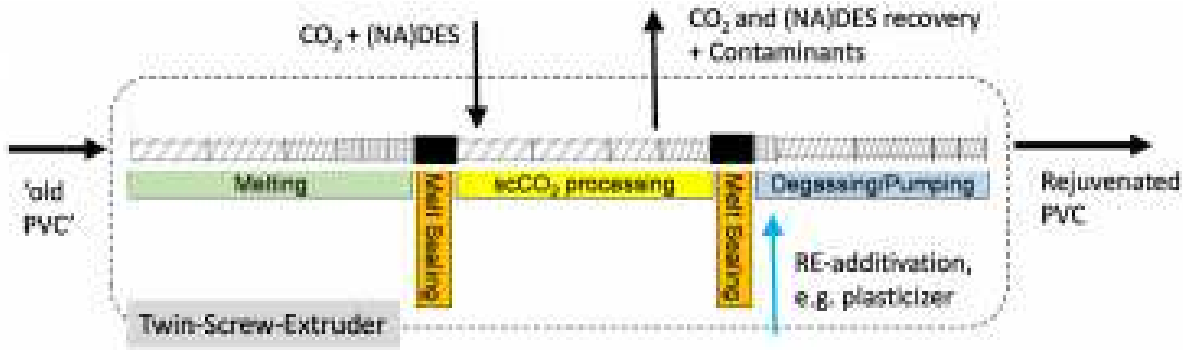

Figure 1. Extrusion process of the REMADYL project

It shows the breakthrough continuous process, which is based on extractive extrusion technology in combination with novel solvents and melt filtration. This has the potential of producing from 'old PVC' new, REACH compliant, high purity PVC to supply the market demand of various soft and hard PVC products with a competitive cost. In this process some substances are both used, extracted and collected. These substances could be subjected to specific standard and legislations. In Table 1 all the materials identified in the REMADYL Grant Agreement are reported.

Chemical Formula	Materials	Name	Materials
Pb	Lead	MoS4	Disulfido(dithioxo)molybdenum (MoS4)
PbSO4	Lead sulphate	C16H22O4	Diisobutyl phthalate (DIBP)
Pb3(PO4)2	Lead phosphate	C16H22O4	benzyl butyl (DBP)
C16H8O8Pb-4	Lead phthalates	C24H38O4	bis(2-ethylhexyl) phthalate (DEHP)
C36H70O4Pb	Lead stearate	C19H20O4	Benzyl butyl phthalate BBP
(C2H3Cl) n	PVC	NADES	Natural deep eutectic solvents

Table 1: Identified materials in the REMADYL technology

2.1 Lead

Lead compounds were used as PVC stabilisers for a variety of applications (window profiles, cable insulation, pipes and flooring etc.). The stabilisers allowed the PVC to endure longer manufacturing routes (heating) and protected it against photo-degradation, thereby prolonging the service life. The main issues of these stabilizers are their effects on human's health. Indeed, lead is a neurotoxic substance to which people can be exposed through diet but also non-food sources. Therefore, a reduction of lead releases from lead stabilised PVC articles is expected to have beneficial effects on human health, especially children (ECHA, 2018). In the frame of REMADYL recycling technology, workers will be most likely exposed to lead during the milling, provoking a release to atmosphere and the washing, implying a release to wastewater (Figure 3). On one side, health and safety directives need to be considered in order to prevent worker of the recycling lines developed within REMADYL project and on the other side, REACH needs to be deeply analysed concerning the further use of lead in new products. REACH is elaborating on the restrictions on manufacture, placing on the market and use of certain dangerous substances, mixtures and articles. Some other directives are the conditions of lead-restriction are outlined in 'entry 63' of REACH (see **Annexes**). These restrictions include thresholds (<0.05%) for the use of lead in jewellery (Regulation (EU) 836/2012) and in articles for the general public or accessible parts thereof which may be placed in the mouth by children (Regulation (EU) 2015/628). Substances which are restricted and used in articles such as PVC products must than also be registered as mentioned in Article 7 of REACH. This Article is then regulating the release of dangerous substances from any kind of article. If the containing lead article is manufactured outside Europe, some requirements are mentioned in Article 8. For a reuse of lead in the foreseen end-use application, the consortium would need to check if restrictions established under REACH are respected (i.e. in batteries). Then, if a general registration is required by Article 7, the information specified in Article 10 will have to be submitted (e.g. identity of the substance, identity of the manufacturer, classification and labelling of the substance, guidance on safe use, a chemical safety report, etc…).

Finally, the end-use of lead is also regulated by the Directive 2006/66/EC on batteries. This directive implies a specific labelling of batteries which contain more than 0.004 % lead with a mark of its chemical symbol: Pb (Article 20). The symbol indicating the heavy metal content shall be printed beneath the symbol shown on Figure 2 and shall cover an area of at least one-quarter the size of that symbol.

Figure 2. Symbol for batteries, accumulators and battery packs for separate collection (EUR-Lex, 2006)

In addition, Article 5 of this Directive aims at increasing the environmental performance of batteries by requiring manufacturers to promote research and encourage improvements in the overall environmental performance of batteries throughout their entire life cycle as well as the development and marketing of batteries which contain smaller quantities of dangerous substances such as mercury, cadmium and lead. REMADYL technology and the recycling of lead into batteries is supposed to improve the environmental impacts of the overall life cycle of the batteries by minimizing the use of primary resources.

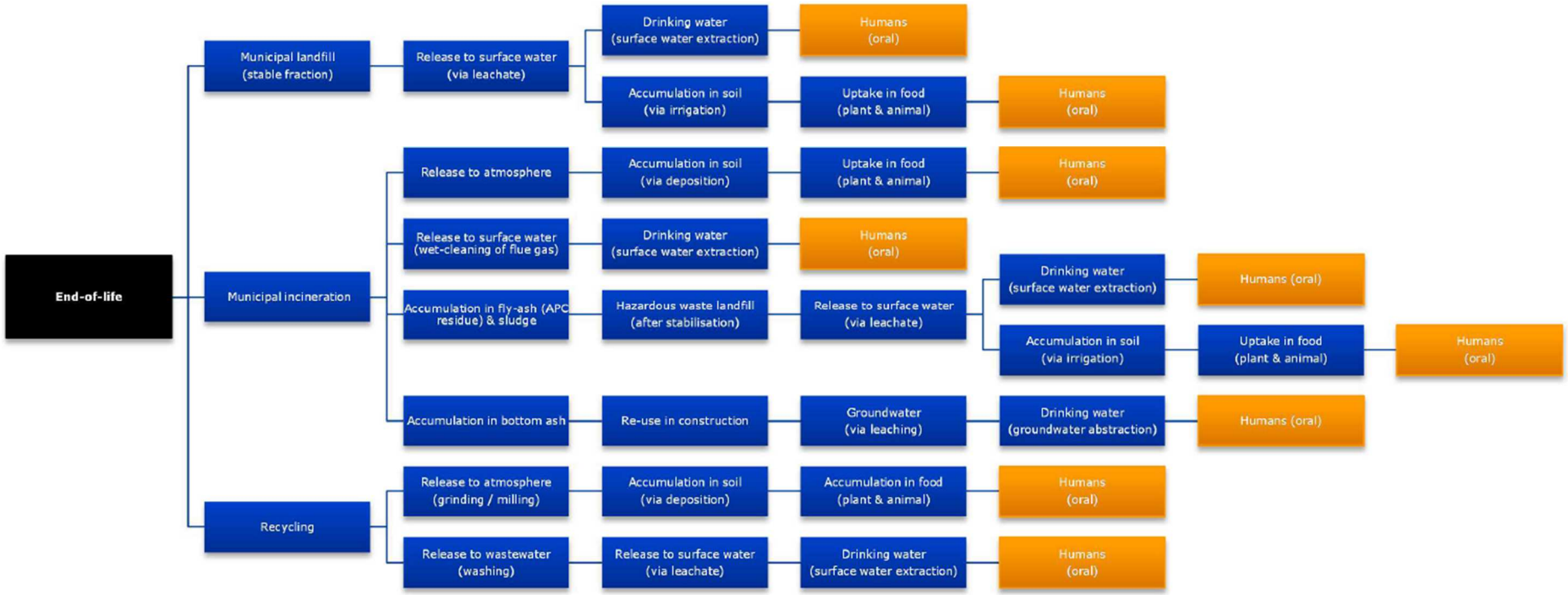

Figure 3. Conceptual exposure pathway for humans relevant to the end of life PVC articles (ECHA, 2018)

2.2 Phthalates

Phthalates are used in hundreds of products, in our homes, hospitals, cars and businesses. The phthalates widely selected to soften vinyl are used because of their strong performance, durability and stability. Because they are used to soften vinyl and make it flexible, in these applications they are called "plasticizers." These phthalate plasticizers are bound into the material in which they are added; they do not easily migrate out of the product or evaporate. Phthalates are the most commonly used plasticizers in the world and are categorized as high and low, depending on their molecular weight. However, they are classified as endocrine disruptors, implying their restriction under REACH (European Chemicals Agency, 2016). In addition, phthalates components are also regulated by the Toy safety directive (TSD) or Directive 2009/48/EC, the RoHS recast (Directive 2011/65/EU) and the regulation (EU) 10/2011 on food contact plastics (Tsang, 2019).

REMADYL process is meant to extract a range of phthalates, as reported in Table 1: DEHP, DBP, BBP and DIBP (Chemical Safety Facts, 2019). Indeed, REMADYL will enable the separation of non-REACH compliant phthalates mainly DEHP (but also others like DBP, DIBP and BBP) from old-PVC.

When focusing at the REACH restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles the following phthalates are identified as restricted for manufacture uses by REACH: DEHP, DBP, BBP, DIBP. The conditions of restriction are elaborated in the appendix under **REACH entry 51**. These restrictions will be investigated in the next version of the report for a further valorisation of the phthalates into new secondary materials.

3 REMADYL - Regulations and Standards

3.1 Management of dangerous substances

Regarding the transport, handling and labelling of hazardous substances of the REMADYL project the following directives may be applicable.

3.1.1 REACH

REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) is one of the most complex regulations of the European Union[1], adopted to improve the protection of human health and the environment from the risks that can be posed by chemicals, while enhancing the competitiveness of the EU chemicals industry. It also promotes alternative methods for the hazard assessment of substances in order to reduce the number of tests on animals. In principle, REACH applies to all chemical substances; not only those used in industrial processes but also in our day-to-day lives, for example in cleaning products, paints as well as in articles such as clothes, furniture and electrical appliances. Therefore, the regulation has an impact on most companies across the EU (REACH, 2019).

3.1.2 Transport

- **Regulation (EC) No 1013/2006 of the European Parliament and of the Council of 14 June 2006 on shipments of waste**, amended by Commission Regulation (EC) No 669/2008, Regulation (EC) No 219/2009, Directive 2009/31/EC and Regulation (EU) No 660/2014. The law aims to control waste shipments to improve environmental protection, when they are made between EU countries, between EU and non-EU countries (export/import) and in transit through the EU on the way from or to non-EU countries. The regulation established two control procedures: general information requirements and a procedure of prior written notification and consent of the shipment. The parties involved must ensure the waste is managed in an environmentally sound way. It bans certain shipments, such as export for recovery of hazardous waste, except those directed to countries to which the OECD decision applies and the import from non-EU countries of waste for disposal or recovery, except: some countries to which the OECD decision applies,

[1] "EU's REACH chemicals law begins life in Helsinki". EUobserver.com. 31 May 2007.

non-EU countries that are party to the Basel Convention, countries that have concluded a bilateral agreement with the EU or EU countries or other areas during situations of crisis**.**

- **Directive 2008/68/EC - inland transport of dangerous goods of 24 September 2008 on the inland transport of dangerous goods.** This Directive replaces Council Directive 94/55/EC, Council Directive 96/49/EC and Council Directive 96/35/EC. This Directive establishes a common regime for all aspects of the inland transport of dangerous goods, by road, rail, and inland waterway between Member States and between Member States and third countries. These dangerous goods include explosives, flammable liquids and materials, toxic, corrosive and radioactive substances. As far as we know, old PVC is not classified as a dangerous substance and this directive will not be in the scope of the analysis.

3.1.3 Handling

The handling of old PVC and its coproduct is a key point in the development and upscaling of REMADYL technology. Therefore, the following directive will likely be of interest.

- **Directive 92/58/EEC - safety and/or health signs** of 24 June 1992 on the minimum requirements for the provision of safety and/or health signs at work (ninth individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC).
- **Directive 2009/104/EC – use of work equipment** of 16 September 2009 concerning the minimum safety and health requirements for the use of work equipment by workers at work (second individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC.
- **Directive 98/24/EC** - **risks related to chemical agents at work** of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16 (1) of Directive 89/391/EEC). The Directive provides for the drawing up of indicative and binding occupational exposure limit values as well as biological limit values at Community level. The employer must determine whether any hazardous chemical agents are present at the workplace and assess any risk to the safety and health arising from their presence. The employer must be in possession of an assessment of the risk in accordance with Article 9 of Directive 89/391/EEC.
- **Regulation (EU) 2016/425 on personal protective equipment** of the European Parliament and of the Council of 9 March 2016 on personal protective equipment and repealing Council Directive 89/686/EEC.

3.1.4 Labelling

- **Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006.** The Classification, Labelling and Packaging (CLP) Regulation purpose is to ensure a high level of protection of health and the environment, as well as the free movement of substances, mixtures and articles. CLP is legally binding across the Member States and directly applicable to all industrial sectors. It requires manufacturers, importers or downstream users of substances or mixtures to classify, label and package their hazardous chemicals appropriately before placing them on the market.
- It should be defined in a next version of the report which are the CLP criteria for REMADYL end-products containing lead and phthalates classification and labelling.

3.1.5 Waste Framework Directive

The Waste Framework Directive (WFD) was constructed by the Academy of European Law in cooperation with the DG Environment of the European Commission in October 2009.

Within the directive two principles are introduced. It elaborates on the "polluter pays principle" and the "extended producer responsibility". It incorporates provisions on hazardous waste and waste oils, and includes two new recycling and recovery targets to be achieved by 2020:

- 50% preparing for re-use and recycling of certain waste materials from households and other origins like households,
- 70% preparing for re-use, recycling and other recovery of construction and demolition waste.

The Directive requires that Member States adopt waste management plans and waste prevention programmes. It sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling and recovery. It explains when waste ceases to be waste and becomes a secondary raw material (so called end-of-waste criteria), and how to distinguish between waste and by-products. The Directive lays down some basic waste management principles: it requires that waste be managed without endangering human health and harming the environment, and in particular without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest (European Commission, 2019).

According to Article 6 (1) and (2) of the Waste Framework Directive 2008/98/EC, certain specified waste shall cease to be waste when it has undergone a recovery (including recycling) operation and complies with specific criteria to be developed in line with certain legal conditions (European Commission, 2019).

In the case of REMADYL technology, the waste management approach seems to be in line with the WFD which prioritize recycling before energetic valorization or landfilling. However, specific waste management criteria of the WFD for dangerous substances such as lead and phthalates should be taken into consideration for the upscaling of the recycling line.

3.2 Standards

Standards that may be applicable to the process and the final product of REMADYL are reported herein after.

3.2.1 Standards for polymers recycling

- **ISO 15270:2008 Plastics** — Guidelines for the recovery and recycling of plastics waste

  Provides guidance for the development of standards and specifications covering plastics waste recovery, including recycling. The standard establishes the different options for the recovery of plastics waste arising from pre-consumer and post-consumer sources.

- EN 15346, Plastics — Recycled plastics — Characterisation of poly (vinyl chloride) (PVC) recyclates. Is the European standard that defines a method of specifying delivery conditions for poly (vinyl chloride) (PVC) recyclates. The standard gives the most important characteristics and associated test methods for assessing of PVC recyclates intended for use in the production of semi-finished/finished products.

- EN 15347, Plastics — Recycled plastics — Characterisation of plastics waste. It provides a scheme for the characterisation of plastics wastes, laying out those properties for which the supplier of the waste shall make information available to the purchaser, and identifying test methods where applicable.

3.2.2 Standards for material property testing

- **ISO 9852:2007** specifies a method for determining the resistance of un-plasticized poly (vinyl chloride) (PVC-U) pipes to dichloromethane at a specified temperature (DCMT). It is applicable to all

PVC-U pipes, irrespective of their intended use. The method can be used as a rapid means of quality control during manufacture.

- **ISO 2898-1:1996:** Plastics — Plasticized compounds of homopolymers and copolymers of vinyl chloride. Establishes a system of designation for plasticized poly (vinyl chloride) (PVC-P) which may be used as the basis for specifications. PVC-P plastics are differentiated by a classification system based on appropriate levels of properties such as Shore hardness, density and torsional-stiffness temperature at 300 MPa and on information about physical form, intended application, additives and colorants. (Under Review will be replaced by ISO/DIS 24023-1);
- **ISO 2898-2:2008** Plastics — Plasticized poly(vinyl chloride) (PVC-P) moulding and extrusion materials: ISO 2898-2:2898 specifies the methods of preparation of test specimens and the test methods to be used in determining the properties of PVC-P moulding and extrusion materials.(Under Review will be replaced by ISO/DIS 24023-1)

3.2.3 Standards regulating PVC products:

- EN 15877 (plastic piping systems for hot and cold-water installations, PVC-C).
- UNE-ISO 16422 (PVC-O pipes and joints for the conveyance of water under pressure).
- EN ISO 1452 (plastic piping systems for water supply and for buried drainage and sewerage under pressure, PVC-U).
- EN 1401 (plastics piping systems for non-pressure underground drainage, PVC-U).
- EN 1329 (plastic piping systems for wastewater discharge within the building structure PVC-U).
- EN 1453 (plastic piping systems with structured-wall pipes for water discharge inside buildings, PVC-U).
- EN 13476 (plastics piping systems for non-pressure underground drainage and buried sewerage. PVC-U, PP and PE structured-wall pipe systems).

3.2.4 Substance detection and extractability

- **ASTM D7823 - 18** Standard Test Method for Determination of low-level Phthalates in Poly (Vinyl Chloride) Plastics by Thermal Desorption—Gas Chromatography/Mass Spectrometry.

- **ISO 3114:1977 Un-plasticized polyvinyl chloride (PVC) pipes for potable water supply — Extractability of lead and tin** — This test method specifies a method of test for the determination of the extractability of certain stabilizers of un-plasticized PVC in order to verify that the extracted quantities do not exceed a certain concentration. Tubular test pieces are prewashed during a fixed time.
- **ISO 8124-6:2018 Safety of toys — Part 6: Certain phthalate esters in toys and children's products** This document specifies a method for the determination of di-iso-butyl phthalate (DIBP), di-n-butyl phthalate (DBP), benzyl butyl phthalate (BBP), bis-(2-ethylhexyl) phthalate (DEHP), di-n-octyl phthalate (DNOP), di-iso-nonyl phthalate (DINP) and di-iso-decyl phthalate (DIDP) (as specified in Annex A) in toys and children's products.

4 Conclusions

This report contains a review of legislation and standardization that can be applied to the identified substances in the REMADYL project. A range of standards and legislations have been investigated, including ISO, REACH and the Waste Framework Directive.

This report will be updated throughout the project duration taking into consideration both European and National level legislations and standards.

5 Further developments

PVC has been at the centre of a controversial debate during much of the last two decades. Several diverging scientific, technical and economic opinions have been expressed on the question of PVC and its effects on human health and the environment. Some Member States have recommended or adopted measures related to specific aspects of the PVC life cycle. However, these measures vary widely (European Commission, 2019).

Therefore, this deliverable will be updated with a review of national standards and legislation of both Belgium and Spain. The partner OVAM will be taking the responsibility to investigate the Belgian standardization and legislation and SIE will investigate on the Spanish side.

Increasing the scope to a national level is needed since there are partners in cooperation in this H2020 project out of five different countries. Knowledge of the standardization and legislation on national level will increase the potential feasibility of the REMADYL project.

During the REMADYL project meeting of month six in Guadalajara some comments were made to widen the analysis of the hazardous substances. It was recommended to include both DIPH & DHPH in the scope, as well as to search for standardization and legislation on the use of scCO2.

Besides this, the vision has been shared to investigate a variety of sources of PVC such as flooring and window framing etc. Having a diverse flow of PVC, might mean that different standardization and legislations might be applied.

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Annexes

REACH Entry 63

7. Shall not be placed on the market or used in articles supplied to the general public, if the concentration of lead (expressed as metal) in those articles or accessible parts thereof is equal to or greater than 0,05 % by weight, and those articles or accessible parts thereof may, during normal or reasonably foreseeable conditions of use, be placed in the mouth by children.

That limit shall not apply where it can be demonstrated that the rate of lead release from such an article or any such accessible part of an article, whether coated or uncoated, does not exceed 0,05 µg/cm² per hour (equivalent to 0,05 µg/g/h), and, for coated articles, that the coating is sufficient to ensure that this release rate is not exceeded for a period of at least two years of normal or reasonably foreseeable conditions of use of the article.

For the purposes of this paragraph, it is considered that an article or accessible part of an article may be placed in the mouth by children if it is smaller than 5 cm in one dimension or has a detachable or protruding part of that size.

8. By way of derogation, paragraph 7 shall not apply to:

(a) jewellery articles covered by paragraph 1;

(b) crystal glass as defined in Annex I (categories 1, 2, 3 and 4) to Directive 69/493/EEC;

(c) non-synthetic or reconstructed precious and semi-precious stones (CN code 7103 as established by Regulation (EEC) No 2658/ 87) unless they have been treated with lead or its compounds or mixtures containing these substances;

(d) enamels, defined as vitrifiable mixtures resulting from the fusion, vitrification or sintering of mineral melted at a temperature of at least 500 ° C;

(e) keys and locks, including padlocks;

(f) musical instruments;

(g) articles and parts of articles comprising brass alloys, if the concentration of lead (expressed as metal) in the brass alloy does not exceed 0,5 % by weight;

(h) the tips of writing instruments;

(i) religious articles;

(j) portable zinc-carbon batteries and button cell batteries;

(k) articles within the scope of:

(i) Directive 94/62/EC;

(ii) Regulation (EC) No 1935/2004;

(iii) Directive 2009/48/EC of the European Parliament and of the Council (**);

(iv) Directive 2011/65/EU of the European Parliament and of the Council (***)

9. By 1 July 2019, the Commission shall re-evaluate paragraphs 7 and 8(e), (f), (i) and (j) of this entry in the light of new scientific information, including the availability of alternatives and the migration of lead from the articles referred to in paragraph 7, including the requirement on coating integrity, and, if appropriate, modify this entry accordingly.

10. By way of derogation paragraph 7 shall not apply to articles placed on the market for the first time before 1 June 2016. (ECHA)

REACH Entry 51

1. Shall not be used as substances or in mixtures, individually or in any combination of the phthalates listed in column 1 of this entry, in a concentration equal to or greater than 0,1 % by weight of the plasticised material, in toys and childcare articles.

2. Shall not be placed on the market in toys or childcare articles, individually or in any combination of the first three phthalates listed in column 1 of this entry, in a concentration equal to or greater than 0,1 % by weight of the plasticised material. In addition, DIBP shall not be placed on the market after 7 July 2020 in toys or childcare articles, individually or in any combination with the first three phthalates listed in column 1 of this entry, in a concentration equal to or greater than 0,1 % by weight of the plasticised material.

3. Shall not be placed on the market after 7 July 2020 in articles, individually or in any combination of the phthalates listed in column 1 of this entry, in a concentration equal to or greater than 0,1 % by weight of the plasticised material in the article.

4. Paragraph 3 shall not apply to:

(a) articles exclusively for industrial or agricultural use, or for use exclusively in the open air, provided that no plasticised material comes into contact with human mucous membranes or into prolonged contact with human skin;

(b) aircraft, placed on the market before 7 January 2024, or articles, whenever placed on the market, for use exclusively in the maintenance or repair of those aircraft, where those articles are essential for the safety and airworthiness of the aircraft;

(c) motor vehicles within the scope of Directive 2007/46/EC, placed on the market before 7 January 2024, or articles, whenever placed on the market, for use exclusively in the maintenance or repair of those vehicles, where the vehicles cannot function as intended without those articles;

d) articles placed on the market before 7 July 2020; (e) measuring devices for laboratory use, or parts thereof;

(f) materials and articles intended to come into contact with food within the scope of Regulation (EC) No 1935/2004 or Commission Regulation (EU) No 10/20111;

(g) medical devices within the scope of Directives 90/385/EEC, 93/42/EEC or 98/79/EC, or parts thereof;

(h) electrical and electronic equipment within the scope of Directive 2011/65/EU;

(i) the immediate packaging of medicinal products within the scope of Regulation (EC) No 726/2004, Directive 2001/82/EC or Directive 2001/83/EC;

(j) toys and childcare articles covered by paragraphs 1 or 2.

5. For the purposes of paragraphs 1, 2, 3 and 4(a),

(a) 'plasticised material' means any of the following homogeneous materials:

- polyvinyl chloride (PVC), polyvinylidene chloride (PVDC), polyvinyl acetate (PVA), polyurethanes,

- any other polymer (including, inter alia, polymer foams and rubber material) except silicone rubber and natural latex coatings,

- surface coatings, non-slip coatings, finishes, decals, printed designs, 1 Commission Regulation (EU) No 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food (OJ L 12, 15.1.2011, p. 1) adhesives, sealants, paints and inks.

(b) 'prolonged contact with human skin' means continuous contact of more than 10 minutes duration or intermittent contact over a period of 30 minutes, per day.

(c) 'childcare article' shall mean any product intended to facilitate sleep, relaxation, hygiene, the feeding of children or sucking on the part of children.

6. For the purposes of paragraph 4(b), 'aircraft' means one of the following:

(a) a civil aircraft produced in accordance with a type certificate issued under Regulation (EC) No 216/2008 or with a design approval issued under the national regulations of a contracting State of the International Civil Aviation Organisation (ICAO), or for which a certificate of airworthiness has been issued by an ICAO contracting State under Annex 8 to the Convention on International Civil Aviation, signed on December 7, 1944 , in Chicago;

(b) a military aircraft. (REACH, 2019)