

REACH AND THE VINYL SECTOR



REACH

Registration Evaluation and Authorisation and Restriction of Chemicals

some principles

- REACH sets out to impose on the whole industrial supply chain from producer to downstream user, the same basic environmental and human health regulations as pharmaceuticals and pesticides.
- REACH sets out to systematically assess the safety of chemicals to ensure that their risks are fully understood and managed and to encourage the substitution and innovation of those that are hazardous and for which they may be better alternatives!

REACH

Administered by ECHA – Helsinki, HSE - UK

Pre-registrations – **They thought** 100-500,000

30,000 substances

Actual 2.75 million pre-registrations

140,000 substances

60,000 companies

SIEF'S

eg Titanium Dioxide 3000 members

Cost to industry

15p to £1/kilo

REACH

SUBSTANCES

OF

VERY

HIGH

CONCERN

SVHC'S

REACH Substances of Very High Concern

SVHC's

- Persistent, Bioaccumulative and Toxic
- Very Persistent and very Bioaccumulative
- Carcinogenic, Mutagenic, disruptors of Reproduction category 1&2
- Or of equivalent concern

Substances of Very High Concern

SVHC's per February 2012

- Candidate list for authorisation by ECHA (currently 73 chemicals)
- Registry of intentions for Annex XV dossiers
 - Submitted SVHC proposal intentions
 - Current SVHC proposal intentions
 - Most low molecular weight phthalates e.g DEHP, DBP, DIBP and BBP – severe restriction on their use imposed particularly children's toys

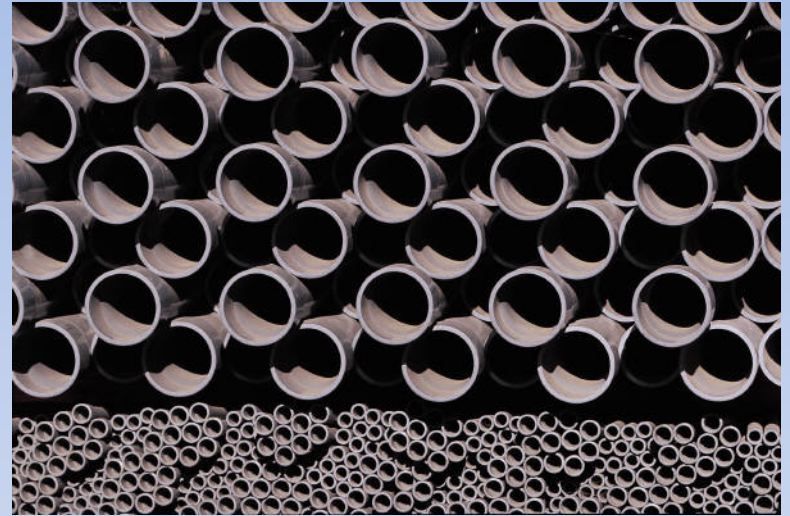
REACH AND WASTE:

- In general recovered polymer collected and sorted from a waste stream and blended or moulded via a manufacturing process to produce an article such as playground furniture is not required to register under REACH legal requirements.
- However, if such an article contains an SVHC then this must be notified to the ECHA if: the article contains more than 0.1% of an SVHC and the volumes produced/imported are greater than one tonne of that SVHC per annum –NEED TO INFORM CUSTOMER
- Substances on the candidate list on 1 December 2010 had to be notified to the ECHA no later than 1 June 2011.
- Substances placed on the candidate after 1 December 2010 must be notified within 6 months of the article being put on the candidate list.
- Notification is free

PVC

A REVOLUTIONARY
IMPACT PARTICULARLY ON
PLUMBING AND
MUNICIPAL WASTE

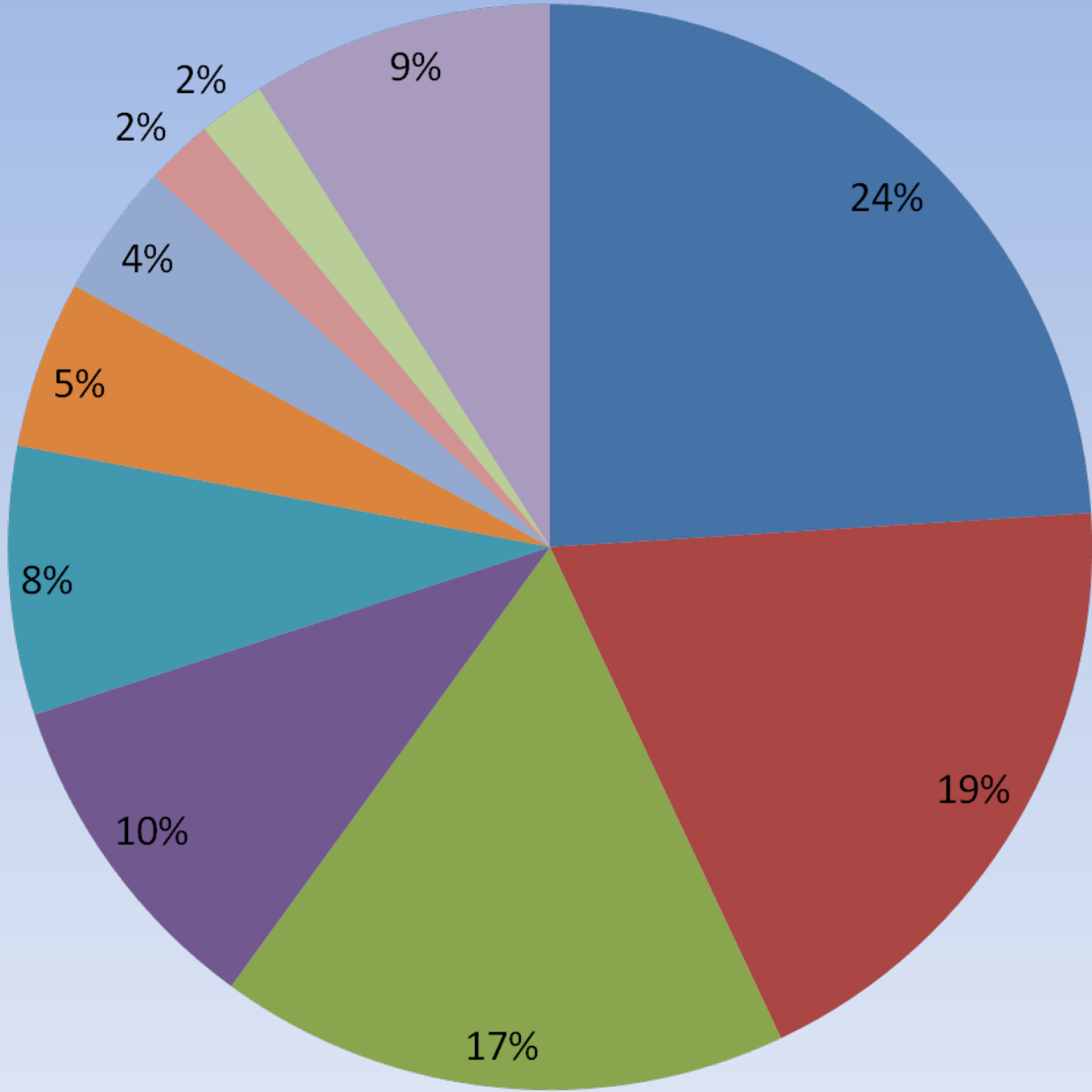
- CHEMICAL
RESISTANCE
- LIGHT WEIGHT
- LOW COST



Constantly changing
chemical picture

World Usage Of PVC

- Pipes
- Films & Sheets
- Profiles & Tubing
- Wiring & Cables
- Bottles
- Flooring
- Coated Fabrics
- Moulded articles
- Records
- Miscellaneous



40 Million
Tonnes
By 2015

oil

Salt

Ethylene

Chlorine

Vinyl Chloride Monomer (VCM)

Polyvinyl Chloride

Additives

Fabricated Article

PVC
Manufacturing
process



Vinyl Chloride Monomer (VCM)

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PVC Health and Safety Issues



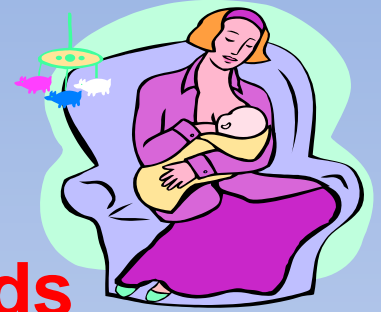
- Vinyl Chloride Monomer is a known carcinogen which has affected workers – vinyl chloride disease
- Organochlorines are Persistent Organic Pollutants - POP's
- Products of incineration of finished product and manufacturing bi-products can include dioxins e.g. ethylene dioxide tars – incineration at sea banned '91
- Additives include heavy metals and potential endocrine disruptors eg phthalate esters.
- To some extent balanced by a contribution to safe handling of sewage in non developed countries.

PVC and other Organochlorines



Health Risks from organochlorine products

POP'S - Persistent Organic Pollutants



Persistent organochlorine compounds detected in mothers milk e.g

- HCB (Hexachlorobenzene) Fungicide – carcinogen
- HCH (hexachlorocyclohexane) Insecticide - liver and kidney toxin.
- DDT (*Dichloro-Diphenyl-Trichloroethane*) Pesticide- Suspected toxic to humans and suspect carcinogen.
- PBDE *polybrominated diphenyl ether* – *fire retardant linked to autism*
- PCDD/PCDF (polychlorinated dibenzo-*p*-dioxins and dibenzofurans (PCDFs)- dioxinlike – toxic
- PCB's (polychlorinated biphenyls) widely used fire retardant, pvc stabiser. Banned and toxic

Flooring and the indoor air quality

Off Gassing Chemicals VOC's detected in buildings at levels higher than external air

POP's



xylene

Diethyl phthalate

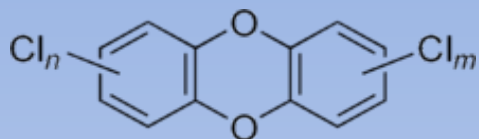
trimethylbenzene

Dibutyl phthalate

decanal

nonanal

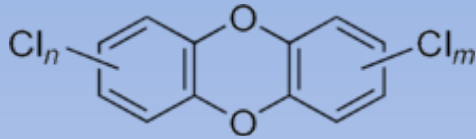




Dioxins

Tetrachlorodibenzodioxin

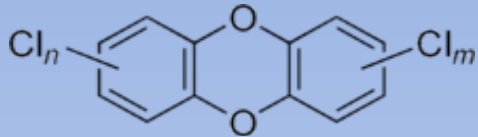
- The most toxic dioxin is TCDD and most of the available data refer to this compound
- Emits toxic fumes of hydrogen chloride and chlorine when heated to decomposition or on exposure to UV light
- TCDD is classified as a causing cancer in humans
- TCDD produces a range of toxic effects on reproduction relating to both fertility and developmental toxicity



Polychlorinated dibenzodioxins (PCDDs)

SOURCES OF DIOXINS

- **natural sources such as volcanoes and forest fires** – as with radiation which occurs naturally it doesn't mean we should release any more of it for the planet to cope with.
- **by-products in the manufacture of some Organochlorines** – **Largest is PVC** others from process- tetrafluoroethane which is used in the manufacture of Teflon and similar stain repellent - long chain fluoropolymers withdrawn
- **incineration of chlorine-containing substances such as PVC**
- **chlorine bleaching of paper**
- **Manufactured as herbicidal warfare chemical "Agent Orange"**



Polychlorinated dibenzodioxins (PCDDs)

SOME MAJOR DIOXINS INCIDENTS

- 1949 Monsanto Virginia
- 1963 Philips Duphar plant Amsterdam
- 1965 – 68 Spolana Neratovice plant Czechoslovakia
- 1976 Seveso – Italy – Seveso Directive
- 1978 Love Canal Niagara Falls
- 1982 – 85 Times Beach, Missouri
- 1999 Dioxin Crisis in Belgium
- 2001 World Trade Centre
- 2008 Irish Pork Crisis

International Response to Dioxin Contamination Incidents

- Dioxins and other Persistent Organic Pollutants (POP's) are subject to the
 - 2004 Stockholm Convention
- The treaty obliges signatories to take measures to eliminate where possible, and minimize where not possible to eliminate, all sources of dioxin

PVC ADDITIVES





PVC ADDITIVES

- Heat Stabilisers – **LEAD, CADMIUM** – PREVENT LOSS OF HCL
 - UV Stabilisers
 - Lubricants
 - Processing Aids
 - Impact modifiers
 - Thermal modifiers
 - Fillers
 - Flame retardants
 - Biocides e.g **phenols**
 - Blowing agents
 - Smoke suppressors
 - Pigments
- **PLASTICISERS - PHTHALATES**

PHTHALATE ESTERS

- **LOW MOLECULAR WEIGHT**
- E.g DEHP, – REACH SVHC – WITHDRAWN by 2015
- Being phased out by pvc industry
- **HIGH MOLECULAR WEIGHT** – being phased in
- Said to be positive regarding SAFE use and all REACH registered (no choice in the matter)
- DINP – REACH RESTRICTED LIST
- TOXICITY TRIALS LIMITED TO SHORT TERM STUDIES e.g 90 day and 130 day studies.
- Long term study results awaited

REACH AND DINP

“ECHA considers that the available new information with regard to hazards and uses of and exposure to DINP does not bring a new perspective to the assessments which were carried out in the past and used as a basis for the current restrictions on DINP.

*Even though further in-depth assessment of the currently available information, and potentially further new information, would be needed to draw firm conclusions on the exact level of risks from certain uses of DINP, this information does not indicate the need for an urgent re-examination of the **existing restriction on DINP**.*

Therefore, ECHA suggests to wait for all the registration dossiers to be submitted for DINP by the first registration deadline, after which the Commission may decide whether specific aspects of these registration dossier(s) should be assessed to confirm or contest the conclusion of this review, that there is no need to re-examine the current restriction.....”

European Chemicals Pressure Groups

ChemSec
SIN LIST

The **SIN** LIST

“Substitute it Now”

- A growing list of 378 chemicals that Chemsec is urging governments to phase out through REACH Legislation which it claims is moving too slowly.
- Chemsec’s board are WWF, Swedish Society for Natural Conservation, Friends of the Earth, Nature and Youth
- Funded by Swedish Govt. John Merck Fund, Swedish EPA, German EPA, European Parliament, Sigrid Rausing Trust, Greenpeace

The **SIN** LIST

“Substitute it Now”

- Supporting Companies Actively Following the SIN List SVHC
- B & Q BOOTS DELL L'OREAL
- NOKIA SARA LEE SKANSKA ERICKSSON
- IKEA H & M ELECTROLUX

How does the recycler look for **phthalates** on the REACH SVHC OR SIN LIST?

- Potential research project with the REACH Centre Lancaster University for a practical analytical tool which can be used by recycling contractors

The REACH Centre

Lancaster University- Jonathan Lutwyche CEO

- The REACH Centre are aiming to producing a simple, cost effective test for the identification of phthalates contained in plastic components. A program of work has been developed in which a combination of 'lab-on-a-chip' technology and efficient chemical methodology will be co-developed to provide a novel semi-quantitative analytical protocol for phthalate detection. By achieving this, The REACH Centre and collaborating bodies will be able to develop a world leading position in the testing and management of phthalates.

The REACH Centre

Lancaster University- Jonathan Lutwyche CEO

- Phthalates esters (usually referred to as 'phthalates') belong to a group of man-made chemical substances that are used as plasticisers in polymers, primarily PVC, where levels can be as high as 40 – 50% by weight. Phthalates are endocrine disruptors and have been implicated in a variety of health problems. Four of them in particular (DEHP, DBP, DIBP and BBP) have been placed on various 'substances of concern' lists around the world and severe restrictions on their use, particularly in textiles, flooring and children's toys, are being imposed.
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- Full-scale testing can be an expensive activity, especially in cases where a particular product or component is obtained from several different suppliers. An inexpensive in-field screening protocol would provide a mechanism to reduce the requirement for full analytical testing by identifying those cases where it is necessary and those where it is not.
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- During 2011, practical work on the development of this new approach to testing of phthalates in plastics commenced. Initial studies were carried out to assess the impact of solvent, temperature, time and sample particle size on extraction efficiency. The aim of this practical work was to identify the mildest and most benign experimental conditions under which phthalates can be extracted reliably from plastics. The conclusions of this work will be used to underpin the design of a new spot test for rapid and hopefully non-destructive testing of phthalates in articles. In addition to the practical work, a literature review was undertaken. The methodology for phthalate sequestration, hydrolysis and complexation have all been investigated with a view to developing a selective colorimetric response to phthalate esters.
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- The REACH Centre is now seeking collaborative partners and funding to progress the work.
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FURTHER INFORMATION

- ALAN BEST
- REACH CENTRE LANCASTER UNIVERSITY
- REACH READY
- HSE