



LIFE / FIT FOR REACH

One step further - substitution

Baltic Environmental Forum – Lithuania
Justė Kukučionė

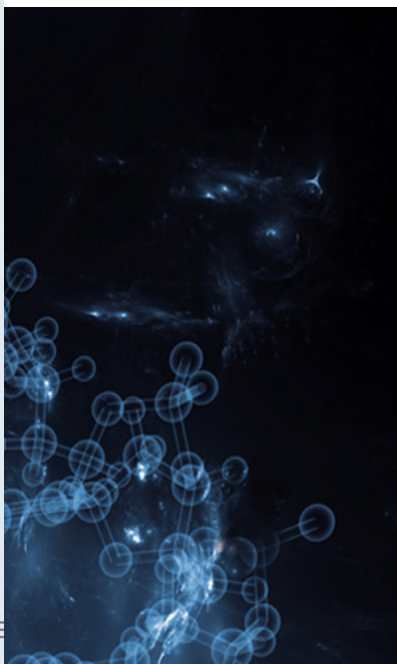



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.



- Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency
- Objective: to encourage industrial enterprises to phase out HS use posing a serious risk for human health and the environment.
- 6 large industries and...
- ~90 "light" cases in companies
- Financial and expert support
- Chemical substitution or other means of risk reduction.
- Helping to implement EU chemicals policy - REACH.

LIFE / FIT FOR REACH

The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE

About..

- Legal background
- Substitution in steps
- Benefits of substitution
- Examples of substitution



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Definition of substitution

Replacing hazardous substances in products and processes by less hazardous or non-hazardous substances, or by achieving an equivalent functionality via technological or organisational measures.



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Substitution in legislation

- **REACH:** An important objective of this Regulation is to encourage and, when possible, to ensure that substances of very high concern are eventually replaced by less dangerous substances or technologies where suitable economically and technically viable alternatives are available.
- **EU Water Framework Directive:** MS shall establish environmental quality standards for priority substances for all surface waters affected by discharges of those substances, and controls on the principal sources of such discharges, based, inter alia, on consideration of all technical reduction options.
- **VOC Solvents Directive:** hazardous substances or mixtures likely to have a serious effect on human health shall be replaced, as far as possible, with less harmful ones "within the shortest possible time".
- **Chemical Agents Directive:** The employer shall ensure that the risk from a hazardous chemical agent to the safety and health of workers at work is eliminated or reduced to a minimum. Where the nature of the activity does not permit risk to be eliminated by substitution, the employer shall ensure that the risk is reduced to a minimum by application of protection and prevention measures.



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Substitution in legislation

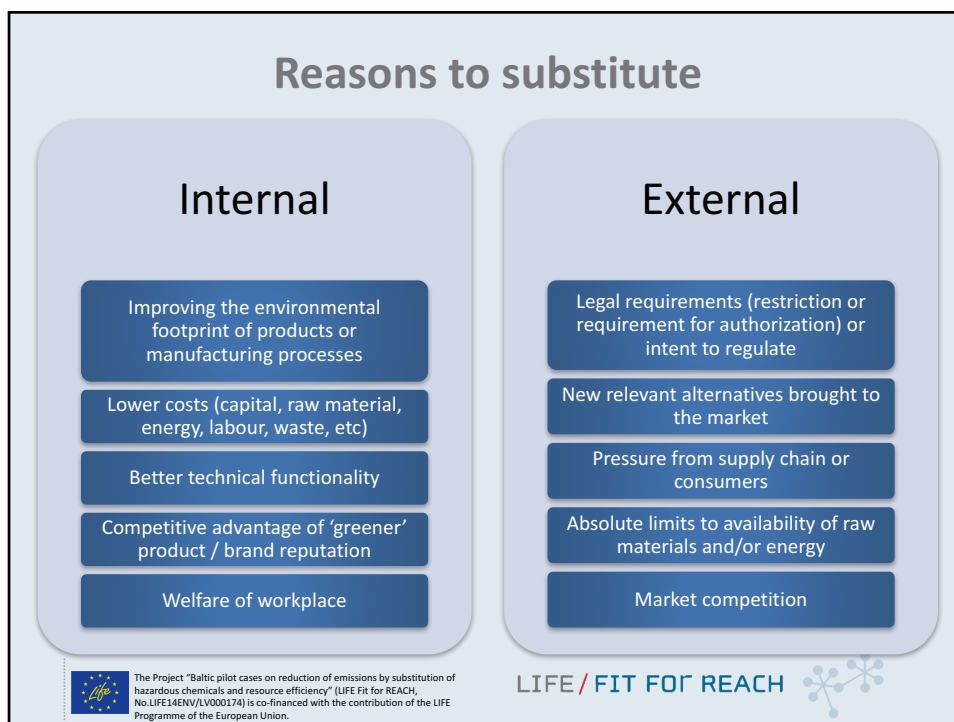
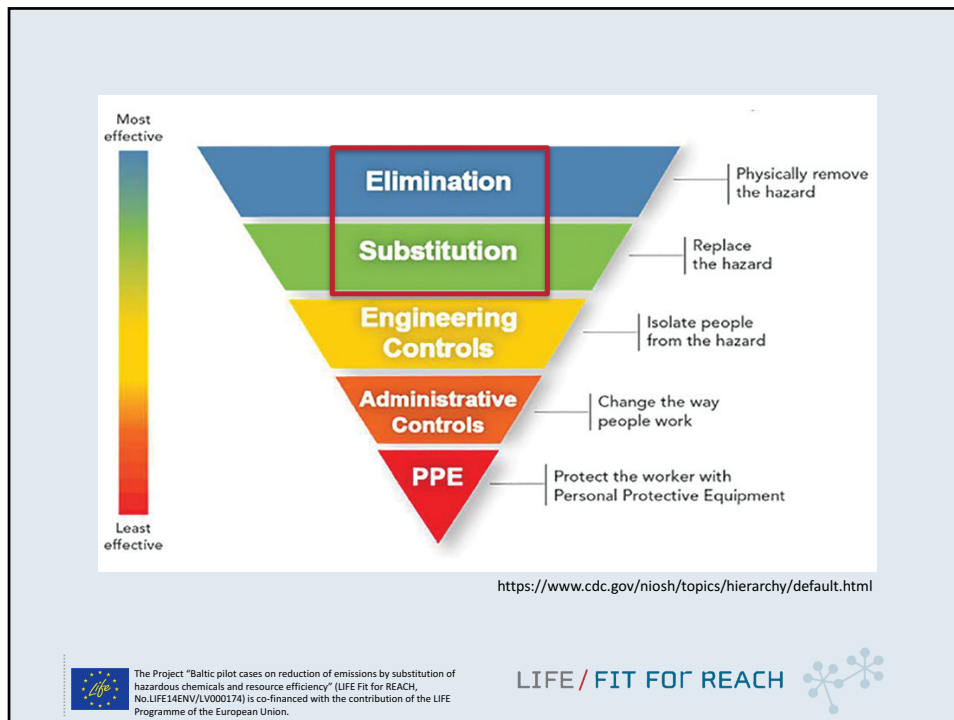
- **Carcinogens and Mutagens Directive:** "The employer shall reduce the use of carcinogens or mutagen at the place of work, in particular by replacing it, in so far as is technically possible, by a substance, preparation or process which, under its condition for use, is not dangerous or is less dangerous to worker's health or safety"
- **RoHS Directive:** restricts certain chemical.
- **Industrial Emissions Directive:** MS shall take the necessary measures to ensure that installations are operated in such a way that all the appropriate preventive measures are taken against pollution, in particular through application of the BAT, which may include the use of less hazardous substances.
- **Stockholm Convention on Persistent Organic Pollutants:** Substitution and development and use of alternatives to POP's are mentioned several times in the Stockholm Convention on POPs.
- **Biocidal Products Regulation:** The BPR excludes the use of some hazardous substances. It also requires products containing substances that are candidates for substitution to be assessed in comparison with similar available products. This may lead to restriction in the authorisation of the biocidal products.



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH





Substitution steps

- 1 • Identify substances of concern
- 2 • Prioritise the candidates for substitution
- 3 • Search for alternatives
- 4 • Assess and compare alternatives
- 5 • Test potential alternatives
- 6 • Introducing the substitute
- 7 • Assessing the change



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Identifying substances of concern

- Make an inventory of the substances you use.
 - The good quality of SDSs is a basis for the inventory;
 - All components of the mixture are listed in the table

General information									
No.	Product name	Substance	Concentration of substance, %	Supplier	Producer	Date of SDS issue/revision	State of aggregation	CAS-No	
1	Airtac 2	Acetone	In textile guide	CHEMTREC	Airtech International	01/02/2017		67-64-1	
		Hexane, a mixture of isomers	In textile guide					107-83-5	
		Cyclohexane	ECHA: Some uses of this substance are restricted under Annex XVII of REACH. Textile Guide, P100					110-82-7	
		n-hexane	ECHA: Suspected to be Toxic to Reproduction; SinList; Textile Guide					110-54-3	
		n-pentane	Textile Guide					109-66-0	
		Propane	Textile Guide					74-98-6	



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Screening the inventory

- Using databases: ECHA, SinList, PRIO, Specific industry related lists: Textile Guide, GADSL for automotive industry.


Substance information

Infocards are automatically generated based on industry data. What is an Infocard?

ic Substance Infocard [See a problem or have feedback?](#)

Formaldehyde RSS

Regulatory process names 20 Translated names 33 EUPAC names 17 Trade names 50 Other identifiers 26 BP

Substance identity	Hazard classification & labelling	Properties of concern
EC / List no.: 200-001-8 CAS no.: 50-00-0 Mol. formula: CH ₂ O <chem>O=CH2</chem>	 Danger! According to the harmonised classification and labelling (ATP06) approved by the European Union, this substance is toxic if swallowed, is toxic in contact with skin, causes severe skin burns and eye damage, is toxic if inhaled, may cause cancer, is suspected of causing genetic defects and may cause an allergic skin reaction. Additionally , the classification provided by companies to ECHA in REACH registrations identifies that this substance is fatal if inhaled and causes serious eye damage.	C Carcinogenic M Suspected to be Mutagenic Ss Skin sensitising

Important to know

Substitute It Now






Don't let hazardous chemicals ruin your product


Is it on SIN? Enter chemical name/CAS/EC **SEARCH**

[View all SIN List Chemicals >](#)

[Read more >](#) [What is the SIN List?](#) [Using the SIN List](#) [Chemical groups](#) [The science behind](#) [Updates](#) [FAQ](#)

Find SIN List Chemicals In Your Industry

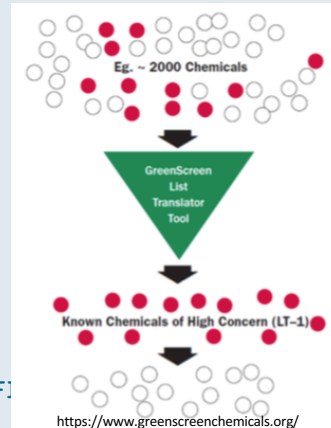
				
View all chemicals	Electronics	Textile	Construction	Food contact materials

 No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

Green Screen



- GreenScreen® List Translator™
- Screening tool designed to quickly identify chemicals of high concern
- 42 Lists from Authoritative Scientific Bodies & NGO Screening Lists
 - EU REACH SVHC
 - US EPA Priority PBT List
 - California Proposition 65 List
 - United Nations – Stockholm POP
 - International Agency for the Research on Cancer (IARC)
 - ChemSec SIN List
 - TEDX Potential Endocrine Disruptors



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / F



Swedish Chemicals Agency

PRIO – A tool for Risk Reduction of Chemicals

Phase-out Substances


Property	Classification according to the CLP regulation for determination of the intrinsic properties
Carcinogenic	(Carcinogenicity, Category 1A and 1B) H350: May cause cancer...
Mutagenic	(Germ cell mutagenicity, Category 1A and 1B) H340: May cause genetic defects...
Toxic to reproduction	(Reproductive toxicity, Category 1A and 1B) H360: May damage fertility or the unborn child...
Endocrine disrupter	(see the criteria in detail)
Particularly hazardous metals (Cd, Hg, Pb)	(see the criteria in detail)
PBT /vPvB – Persistent, Bioaccumulating, Toxic / very Persistent, very Bioaccumulating	(see the criteria in detail)
Ozone-depleting substances	(Hazardous to the ozone layer) EUH059: Hazardous to the ozone layer H420: Harms public health and environment by destroying ozone in the upper atmosphere.

Priority Risk-reduction Substances

Property	Classification according to the CLP regulation for determination of the intrinsic properties
Very high acute toxicity	(Acute toxicity, Category 1 and 2) H330: Fatal if inhaled H310: Fatal in contact with skin H300: Fatal if swallowed (Specific target organ toxicity after single exposure) H370: Cause damage to organs.* and **
Allergenic	(Respiratory or skin sensitisation, Category 1, 1A and 1B) H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled. H317: May cause an allergic skin reaction
High chronic toxicity	(Specific target organ toxicity after repeated exposure) H372: Cause damage to organs through prolonged or repeated exposure.* and **
Mutagenic	(Germ cell mutagenicity, Category 2) H341: Suspected of causing genetic defects...
Environmentally hazardous, long-term effects	(Hazardous to the aquatic environment, Chronic Category 1 and 4) H410: Very toxic to aquatic life with long lasting effects. H413: May cause long lasting harmful effects to aquatic life
Potential PBT / vPvB	(see the criteria in detail)

Programme of the European Union.

<https://www.kemi.se>



KEMI
Swedish Chemicals Agency

PRIO – A tool for Risk Reduction of Chemicals

Search result

[Back](#)
[New Search](#)
[Download](#)

There can be other substances which fulfill the PRIO criteria. These are only examples. [Read more..](#)

Priority risk reduction substance/Phase-out substance - how do I act?

Click on a substance name or group name in the table for further information.


You have searched for:

Substances: 50-00-0


The search resulted in 1 hits on substances:

Substance	CAS No	EC No	Priority level	Criteria
▶ Formaldehyde CH ₂ O Formaldehyde solution Formalin Metanal Paraform	50-00-0	200-001-8	Phase-out substance	<ul style="list-style-type: none"> • CMR (category 1A and 1B), Carcinogenic • PBT/vPvB • Allergenic • Mutagenic(Category 2)

<https://www.kemi.se>



No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.





TEXTILE GUIDE

>6500 chemicals

FILTER your SEARCH RESULTS

Lists

Hazard Groups

Functional Groups

Number of results

200 results for filters "Dyes and pigments" in the Textile guide.

CAS/EC Number Name	Functional/Hazard Groups	
CAS 569-64-2 (4-(2-(4-(dimethylamino)phenyl)benzylidene)cyclohexa-2,5-dien-1-ylidene)dimethylammonium chloride	Dyes and pigments H361 Suspected of damaging the unborn child or fertility H400 Very toxic to aquatic life H410 Very toxic to aquatic life with long-lasting effects	<div style="border: 1px solid #ccc; padding: 2px; display: inline-block;">ADD</div> <div style="border: 1px solid #ccc; padding: 2px; display: inline-block;">CLOSE</div>

List Categories

Company & textile sector lists

US regulatory lists

Lists

AFIRM
Bluesign
EU Ecolabel
Good Environmental Choice Ecolabel
GOTS
H&M
Nordic Ecolabel
Oeko-Tex
Puma
ZDHC

US EPA TRI

This substance is recognised as hazardous by the following lists and categories.

<http://textileguide.chemsec.org>



The haz No. Programme of the European Union.



Some other lists

- Global Automotive Declarable Substance List (GADSL): The global standard list for declaring the composition of parts within the automotive industry.
- IMDS : Automobile industry's material data system.



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Prioritise the candidates for substitution

- Considered the most hazardous (e.g. using PRIO, GreenScreen, SinList),
- Substances that may not be absolutely necessary for a product to function,
- Substances that may be subject to regulatory actions or market pressure in the near future.



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Finding alternatives

- Set criteria for selecting possible alternatives.
- Initially, fewer (pre)screening criteria may be used. This would eliminate at an early stage those alternatives that are not safe enough: CMRs and substances of equivalent concern, such as endocrine disruptors, also sensitisers or neurotoxicants.
- Other criteria may be added to differentiate between alternatives that have passed the screening criteria.
- Cost, availability on the local market, and other advantages may be considered.



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Finding alternatives

Several substitution options should be considered:

- switching to a less hazardous chemical/mixture
- using an alternative technique
- creating a different product design

In practice, it is usually a combination of these actions

"How would I have solved the problem if in the first place I did not have access to that particular chemical?"

"Can the product be replaced by another, or can changes in the manufacturing process or in product design mean that the substance is not needed at all?"



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



www.kemi.se

Function vs chemical structure

- Understand what function unwanted chemical has in the production process or what properties it gives the final product.
- This is key to allow a wider range of substitution solutions.
- Rather than focusing on similar chemical drop-in substitutes, which often have similar toxicity, may lead to 'regrettable substitution'.
- This approach – known as 'functional substitution' – helps to avoid regrettable substitution and can lead to process and product innovation opportunities.

Search the SINimilarity tool

Identify if your chemicals are linked to any in the SIN List by group, structure or both.

CAS Number or chemical name

SEARCH

Programme of the European Union.

Function vs chemical structure

Example: use of phthalates in PVC printing on textiles:

- The function of the phthalate, in this case, is to make the PVC plastic soft
- If we only consider the function we may find an alternative non-phthalate plasticiser to substitute the phthalate for.
- Looking at the use – which is PVC for textile printing – we may consider changing to another type of printing paste that does not require plasticisers, such as polyurethane or silicone.
- The “need” in this case is to produce clothes that are attractive. This can also be achieved by means other than printing (e.g. Embroidery).



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Where to search for alternatives?

- Contact your supplier
- Other suppliers
- Ask the supplier to formulate a safer alternative.
- Relevant case studies targeting similar applications (Subsport plus, OECD Toolbox)
- Professional associations
- NGOs
- Trade unions
- Scientific articles
- Just google it 😊



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



chemsec
MARKETPLACE

Quick search alternatives



Login / Register



Future-proof your business

Find safe alternatives to hazardous chemicals

Marketplace gathers all green chemistry innovations in one place, making it easier for companies to choose safer solutions. Search advertisements of safer alternatives and connect with suppliers.

[Read more](#) [How it works](#) [Find alternatives](#) [Add alternative](#) [Submit request](#) [Terms & conditions](#) [News](#) [FAQ](#)

- The alternatives do not contain intentionally added hazardous substances, or contaminants, with SVHC properties above 0.1% (1000 ppm):
 - CMR substances, endocrine disruptors, PBTs and vPvBs as well as the toxic cousins of such substances.
- Evaluate the information supplied by the companies - SDSs, Technical Data Sheets and Third-Party Labels. Also, using publicly available data from authorities and published journals whenever it is available. For some cases – when data is not accessible – QSAR tools are used to get an understanding of the possible hazardous properties.



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



chemsec
MARKETPLACE

Quick search alternatives

Login / Register

Future-proof your business

Find safe alternatives to hazardous chemicals

Marketplace gathers all green chemistry innovations in one place, making it easier for companies to choose safer solutions. Search advertisements of safer alternatives and connect with suppliers.

[Read more](#) · [How it works](#) · [Find alternatives](#) · [Add alternative](#) · [Submit request](#) · [Terms & conditions](#) · [News](#) · [FAQ](#)

Search results Sin List: 1

SIN List - 1 results

Print
Download.xls
Share

CAS Number	Chemical Name	SIN Groups	Marketplace Alternatives
50-00-0	Formaldehyde	Highly reactive compounds (Highly reactive compounds)	<div> <div>✓</div> </div>

The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH

SUBS PORT
Substitution Support Portal

MOVING TOWARDS SAFER ALTERNATIVES

Case story database

You can use the free text search function to find information in the case story database. Use the search filters to refine your search.

Please enter your search text or numerical substance identifier

Search filters

Sector

All

More search filters

Items per page

15 25 60

Search Database

New search
Show methodology
Show all case stories
Show all abstracts

English 374
Translations
German 91

The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH

Substituted substance(s)

Tetrahydrofuran
CAS No. 109-99-9 EC No. 203-726-8 Index No. 603-025-00-0

2. **1,4-Dioxane**
CAS No. 123-91-1 EC No. 204-661-8 Index No. 603-024-00-5

3. **tert-Butyl methyl ether**
CAS No. 1634-04-4 EC No. 216-653-1 Index No. 603-181-00-X

4. **Tetrahydro-2-methylfuran**
CAS No. 96-47-9 EC No. 202-507-4 Index No.

» Show more substance information


1.


Alternative substance(s)

1. **Cyclopentyl methyl ether**
CAS No. 5614-37-9 EC No. Index No.

2. **Butylhydroxytoluene**
CAS No. 128-37-0 EC No. 204-881-4 Index No.


Other type of alternative





The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



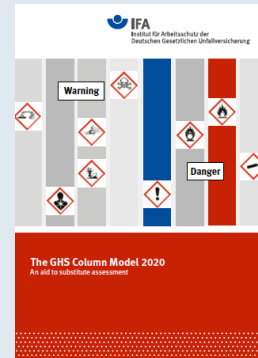
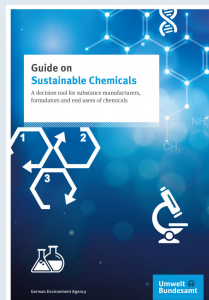
Assessing and comparing alternatives

- Hazard and risk assessment
- Technical performance assessment
- Economic viability assessment
- Assessment of other impacts
 - Availability of alternatives
 - Changes to processes
 - Life-cycle considerations: energy, waste/discharge, CO²emissions, etc.
 - Recycling
 - Social impact



Methods to assess alternatives

- [GHS Column model](#)
- [Green Screen for Safer Chemicals](#)
- [SubSelect](#)



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



GHS Column Model



- Can help to make a quick comparison of substances and mixtures under specific process conditions
- Only need the brief information found in the SDS or on the package labelling: hazard statements and process conditions
- Very suitable for SMEs, especially when to select less hazardous chemical to formulate safer mixture
- Free of charge
- Drawbacks:
 - Mixtures are not assessed based on their components but on their overall classification
 - Relies on correct SDSs

The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Column Model						
1 Risk	2a Acute health hazards (single exposure)	2b Chronic health hazards (repeated exposure)	3 Environmental hazards	4 Physico-chemical hazards (fire, explosion, corrosion)	5 Hazards from release behaviour	6 Process-related hazards
Very high	Acutely toxic, Cat. 1 and 2 (H300, H310, H330)	Carcinogenic substances/mixtures, Cat. 1A/1B (AGS: K1, K2, H350, H350i)	Substances/mixtures acutely hazardous to the aquatic environment, Cat. 1 (H400)	Unstable explosive substances/mixtures (H200)	Liquids with a vapour pressure of > 250 hPa (mbar) (e.g. dichloromethane)	Open processing
High	Acutely toxic substances/mixtures, Cat. 3 (H301, H311, H331)	Carcinogenic substances/mixtures, Cat. 2 (AGS: K3, H351)	Substances hazardous to the ozone layer (H420)	Flammable aerosols, Cat. 1 (H222)	Liquids with a vapour pressure of 50-250 hPa (mbar) (e.g. methanol)	Partially open design, process related opening with simple extraction, open with simple extraction
Medium	Acutely toxic substances/mixtures, Cat. 4 (H302, H312, H332)	Substances/mixtures toxic to reproduction, Cat. 2 (AGS: R-3, R-3, H361, H361f, H361d, H361fd)	Substances/mixtures chronically hazardous to the aquatic environment, Cat. 3 (H412)	Flammable aerosols, Cat. 2 (H223)	Liquids with a vapour pressure of 10-50 hPa (mbar), with the exception of water (e.g. toluene)	Closed processing with possibilities of exposure, e.g. during filling, sampling or cleaning
Low	Skin-irritant substances/mixtures (H315)	Substances chronically harmful in other ways (no H-phrase, but still a hazardous substance!)	Substances/mixtures chronically hazardous to the aquatic environment, Cat. 4 (H413)	Self-reactive substances/mixtures, Type G (no H-phrase)	Liquids with a vapour pressure of 2-10 hPa (mbar) (e.g. xylene)	Closed design, tightness ensured, partially closed design with integrated extraction, etc
Negligible	Safe substances based on experience (e.g. water, paraffin, etc.)		Substances/mixtures not hazardous to the aquatic environment	Non-combustible or only not at all readily flammable substances/mixtures (flash point of liquids > 100 °C, no H-phrase)	Liquids with a vapour pressure of < 2 hPa (mbar) (e.g. ethylene glycol)	Process index 0,25 according to TRGS 500


 hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.
 
 [https://www.slideshare.net/DirJan/module-2-moving-towards-safer-chemicals]

Green Screen



- Hazard assessment tool, not risk
- Three main steps:
 - assess and classify hazards
 - assign a GreenScreen Benchmark™ score
 - make informed decisions
- Three types of assessments
 - Unaccredited; Assessor: Anyone
 - Authorized; Assessor: Authorized GreenScreen® Practitioner
 - Certified; Assessor: Licensed GreenScreen® Profiler



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Assess and Classify Hazards

GreenScreen for Safer Chemicals: Hazard Endpoints

Environmental Fate	Environmental Health*	Human Health Group 1	Human Health Group II	Physical Hazards
Persistence (P)	Acute Aquatic Toxicity (AA)	Carcinogenicity (C)	Acute Mammalian Toxicity (AT)	Reactivity (Rx)
Bioaccumulation (B)	Chronic Aquatic Toxicity (CA)	Mutagenicity & Genotoxicity (M)	Systemic Toxicity & Organ Effects (incl. Immunotoxicity) (ST)	Flammability (F)
		Reproductive Toxicity (R)	Neurotoxicity (N)	
		Developmental Toxicity (incl. Developmental Neurotoxicity) (D)	Sensitization (SnS)	
		Endocrine Activity (E)	Respiratory Sensitization (SnR)	
			Skin Irritation (IrS)	
			Eye Irritation (IrE)	

*Other ecotoxicity studies when available.

Programme of the European Union.

Hazard summary table

Group I Human					Group II and II* Human										Ecotox		Fate		Physical	
Carcinogenicity	Mutagenicity	Reproductive Toxicity	Developmental Toxicity	Endocrine Activity	Acute Toxicity	Systemic Toxicity	Neurotoxicity	Skin Sensitization*	Respiratory Sensitization*	Skin Irritation	Eye Irritation	Acute Aquatic Toxicity	Chronic Aquatic Toxicity	Persistence	Bioaccumulation	Reactivity	Flammability			
						single	repeated*	single	repeated*	.	.									
L	L	L	M	M	L	L	L	vH	H	L	DG	L	L	H	H	vL	L	M	L	

1. Hazard Classification

- vH = very High
- H = High
- M = Moderate
- L = Low
- vL = very Low
- DG = Data Gap

2. Level of Confidence:

- Bold** = High confidence
- Italics* = Low confidence

16

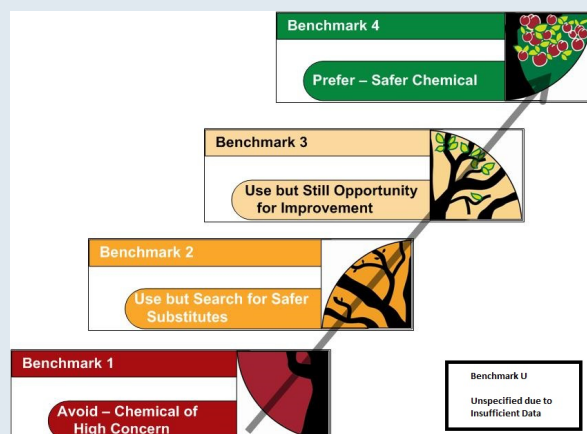


The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Assign a GreenScreen Benchmarks™ Score



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



GreenScreen Evaluation of Methylene Chloride and Alternatives

Chemical	CASRN	Benchmark Score
Methylene chloride	75-09-2	1
Benzyl alcohol	100-51-6	2
2-(2-butoxyethoxy) ethanol	112-34-5	2
Dimethyl sulfoxide (DMSO)	67-68-5	3
1,3-dioxolane	646-06-0	2
Estasol (dibasic esters mixture)	95481-62-2	2
d-Limonene	5989-27-5	2
Acetone	67-64-1	2
Methanol	67-56-1	1
Toluene	108-88-3	1
Formic acid	64-18-6	2
Caustic soda	1310-73-2	2



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



SubSelect

- IT application based on MS® Access
- Funded by the German Environment Agency
- Supports DU companies in sustainability assessment of alternatives so they
 - select alternatives which can be used in the long run
 - prevent shifting problems from toxic to other adverse impacts
- Compared to other assessment programmes:
 - Simple, quick and IT-supported
 - Logical questions and reduced to minimum information needs
 - No in-depth knowledge necessary on hazards (as e.g. required for GreenScreen)
 - Direct and visual comparison of substances
- Assessment of substances and mixtures
- It is planned to integrate exposure aspects into SubSelect



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



8 substance-related criteria

Substance list (Y/N)	REACH Candidate list, REACH Annex XIV, Priority substances of WFD, OSPAR, POPs, Montreal Protocol, Endocrine disrupter (Danish List), Substitute It Now List (SIN List)
Hazardous to human health	Inhalation, ingestion, eye contact (H statement); Dermal contact (H statement); EDC (lists; appropriation via qualitative information)
Hazardous to the environment	PBT/vPvB (CAS number/listing); Aquatic toxicity
Physical hazard	Flammability, explosiveness etc. (H statements)
Mobility	Release potential to water (water solubility), Release potential to air; env./hh (vapour pressure), Long range transport (half-life), Release potential at the work place (dustiness)
Greenhouse gas emissions	Kg/CO2 per kg produced
Resource consumption	type of raw material (mineral/renewable plus), energy consumption (MJ/kg produced), water consumption (l/kg produced)
Supplier responsibility	workers protection, environmental protection, social engagement



hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



COMPARISON OF SUSTAINABILITY OF MIXTURES		
Window cleaner		
<i>Inclusion in priority substances lists</i>	1	
<i>Physical chemical properties</i>	1	
<i>Hazardousness for humans</i>	2	
Inhalation, ingestion, eye contact	2	
Dermal contact	2	
Endocrine disruption	2	
<i>Hazardousness for the environment</i>	2	
PBT/vPvB	1	
Aquatic toxicity	2	
<i>Mobility of the substance</i>		
Water		
Air (environment)		
Long range transport		
Air (humans)		
Work place		
<i>Greenhouse gas emissions</i>	1	
<i>Resource consumption</i>		
Renewability of raw materials		
Energy consumption	1	
Water consumption	1	
<i>Responsibility in the supply chain</i>		
Worker		
Environment		
Social		
<i>Share of unknown components</i>	0,0003 %	



The Project "Baltic hazardous chemicals (No LIFE14ENV/LV000174) Programme of the European Union.

Test, implement and improve

- Small-case pilot testing
- Fully implement the alternative once pilot test has been successfully launched and finalised.
- Necessary continuous improvements based on the received feedback

ASSESSMENT	CURRENT	ALTERNATIVE 1	ALTERNATIVE 2
Technical feasibility			
Hazardousness for humans			
Hazardousness for environment			
Performance			
Image			
Environmental permits			
Sustainability			
Overall assessment			



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Benefits for the company

- Simply doing the right thing or as a critical component of their sustainability goals.
- Substitution to reduce the potential risk of your activities:
 - to your employees who work with the hazardous substance,
 - to consumers using your products
 - and to the environment can play a big part in making Europe a healthier place for all of us and for future generations.
- Improve production efficiency, drive innovation
- Gain a competitive advantage
- Save costs



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT



shutterstock.com • 684694765

To summarise..

- Substituting substances is not necessarily a simple replacement of one chemical with another.
- Methods that work in one company may not work for your product or process.
- Don't forget production techniques and/or product design.
- You may also need to try several alternatives before you find the best one.
- In your assessment, beyond the consideration of hazard, exposure, technical performance and economic aspects, it is important to also look at wider effects, where these are relevant, such as energy and resource use, waste, and recycling and socio-economic impacts.



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Information resources:

- [Substances of concern: Why and how to substitute?](#)
- [Guide on sustainable chemicals – German Environment Agency.](#)
- [Substitution guidance](#)
- <https://sinlist.chemsec.org>
- <https://www.subsportplus.eu>
- <http://www.oecdsatoolbox.org>
- <https://marketplace.chemsec.org>
- [SubSelect - Guide for the Selection of Sustainable Chemicals](#)
- [The GHS Column Model](#)

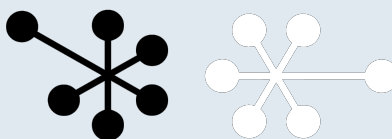


The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



LIFE / FIT FOR REACH



Substitution examples



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

Bisphenol A (BPA) in food industry

- BPA derived epoxy resins in use since 1960s
- ~ 300 bln. beverage cans + ~ 75 bln. food cans / year globally
- Epoxy resin coatings dominate
- BPA residues present in FCMs
- Migration into food products
- Toxic to Reproduction, Endocrine Disrupting, Skin Sensitizing



2015	France. National legal acts	Ban of BPA-based coatings in food & beverage cans
2017	REACH regulation	Candidate list
2018 Sept	Food contact materials (FCM)	Specific migration limit (SML) for BPA in varnishes and coatings intended to come into contact with food is 0.05 mg/kg (<i>0.6 – before</i>)



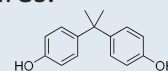
The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Bisphenol A (BPA) in food industry

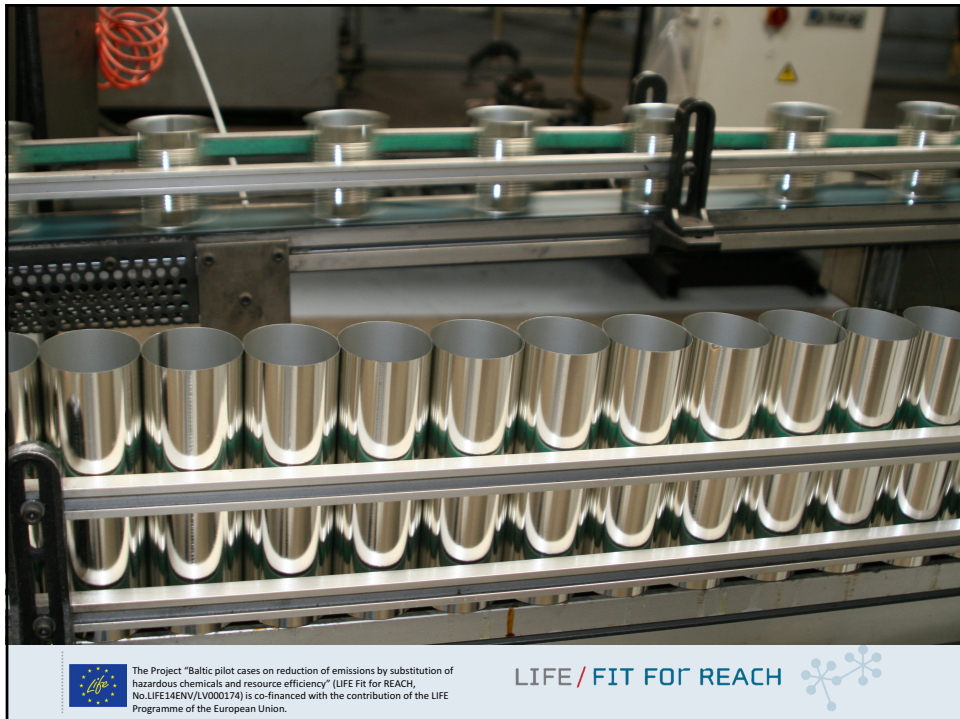
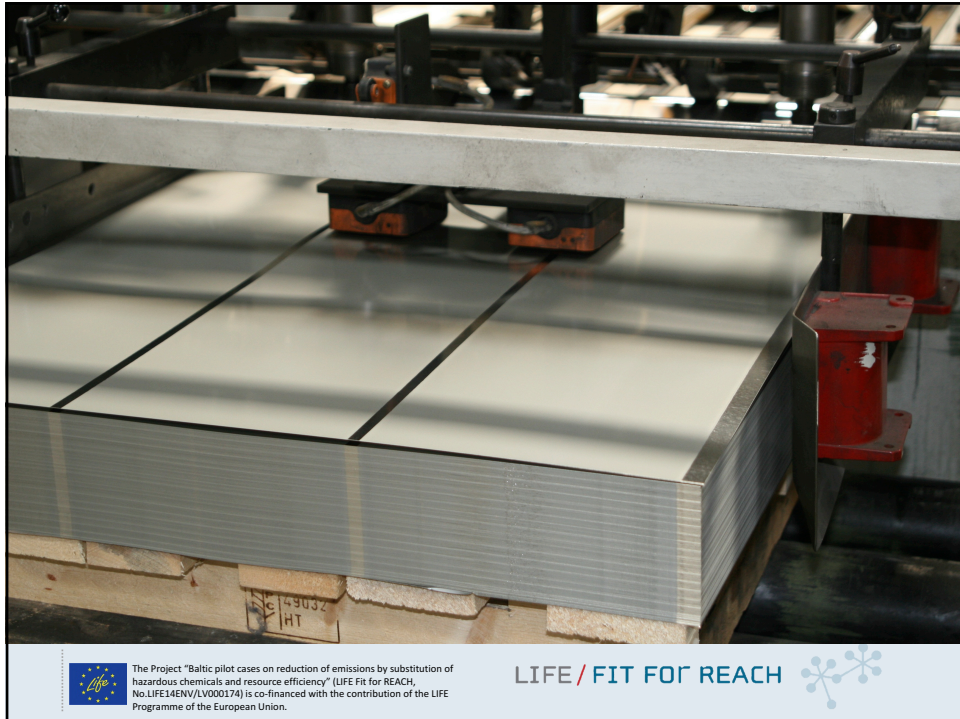
- Cooperation with a canned milk producer began in 2016.
- To phase-out BPA and other HS in manufacture.
- Evaluation of coatings, can parts, other mixtures.
- Alternative search and testing.
- Several solutions: different packaging (glass/plastic), alternative coatings.
- Selected option: alternative coating for body+ alternative cap (article) + alternative technology for side-stripe.
- No more than 5% cost increase.
- At the end – BPA use and OSH risk will be reduced due to formaldehyde and other volatile phase out in manufacture.

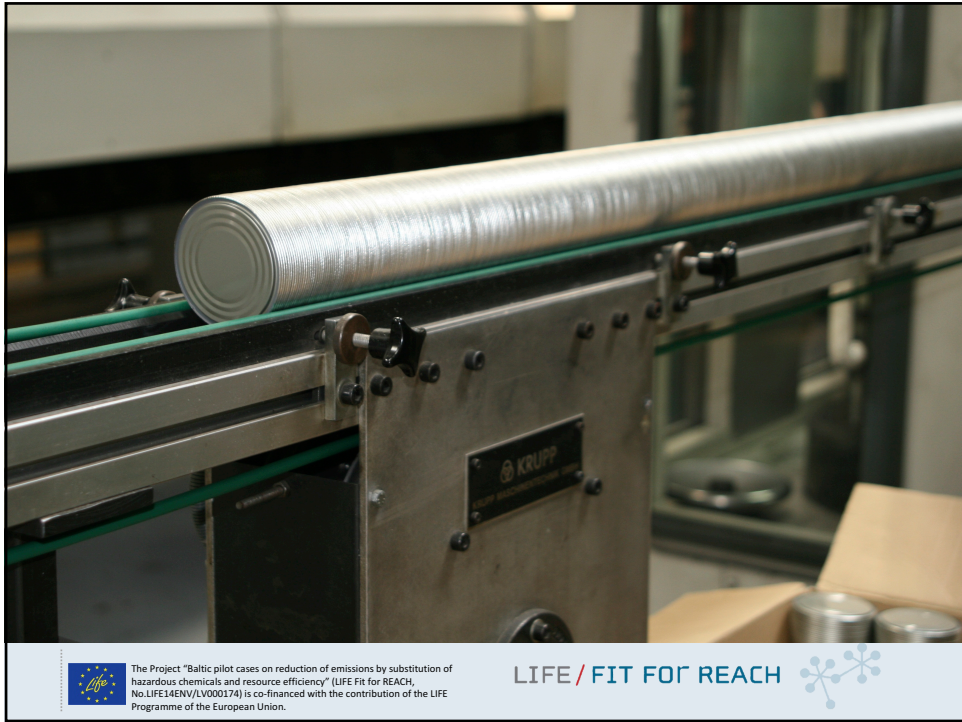


The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH









...but not without hurdles on the way

- Technical challenges and alternative product availability issues plagued.
- Communication to obtain information is not easy.
- Ever since BPA exposure became a hot topic, alternative coatings started emerging in the market:
alternative epoxy; oleoresin; phenolic; vinyl derived; polyester; polyolefin, etc.
- Still limitations for product choice due to:
 - compatibility of manufacture equipment/technology
 - supply chain limitations (unavailability of services, unavailability of products for certain markets/or scales)
 - customer requirements (e.g. lacquer colour)
 - incompatible product chemistry for certain food groups
 - shelf-life

The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Overall achievements

- 3 years of work led to finding BPA free solution.
- Lowered occupational risk.
- Chemical issues are better known within the company now.
- Awareness raising for industry/consumers.



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Textile company refuses acetone

- Acetone (VOC) was used to wash contaminated parts of the machines used to produce the textiles.
- Highly flammable liquid and vapour, causes serious eye irritation and may cause drowsiness or dizziness
- ~700 kg/year



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Textile company refuses acetone

- It was chosen washing equipment with probiotic detergents
- Contaminated machinery parts are decomposed in a bacterial fluid bath
- Detergent is long-term use, no need to change it for at least 12 months



Anti-fouling paints

- Based on copper-zinc oxides - biocides.
- Chemicals which impede growth of barnacles, algae, and marine organisms
- Very toxic to aquatic environment
- Increased concentrations of dissolved Cu and Zn in harbor waters



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Anti-fouling paints

- Various alternatives considered: enzyme-based, more effective biocide-based, hydrophobic surface that does not stick to marine organisms, "polishing", etc.
- A few completely environmentally friendly choices.



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Anti-fouling paints

- Selected alternative without biocides: Fluoropolymer-siloxane-based hybrid coating.
- The price goes up 3x.
- But... thanks to its surface properties, fuel consumption is reduced by 10%.
- Service life is 2-3 times longer.
- Payback in 5 years.



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Reduction of styrene emissions

- The company impregnates glass or carbon fiber fabrics with resins which contains styrene.
- These materials further are used in marine industry for hulls, decks, also sofa constructions and other large components when strength and weight are important.

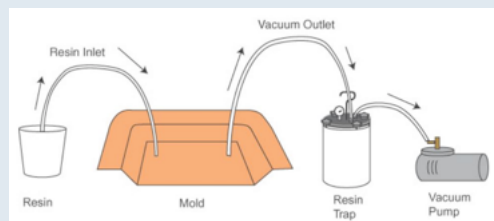


The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.



Reduction of styrene emissions

- Styrene is suspected to be Toxic to Reproduction
- There are two ways how to impregnate the fiber – manual and vacuum infusion.
- Company motivation - wants to have better workplace environment and be more effective.



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

LIFE / FIT FOR REACH



Reduction of styrene emissions

It was chosen to automate the process by installing resin transfer molding equipment (RTM). The advantages of the method compared with manual way:

- significant decrease of evaporation of styrene while dosing and mixing the ingredients;
- dosing for infusion is optimized;
- less pollution of production bar, mixing tools;
- the use and emissions of styrene reduced by ~10%, this is ~12 t/y;
- less waste when finishing the product (reduction ~70-80%);
- higher work efficiency (2-3 times faster to manufacture 1 product);
- mechanical properties of the product has improved.

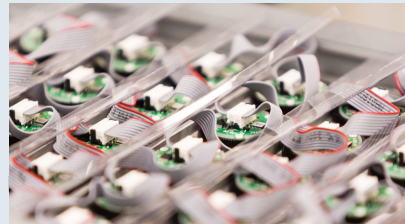
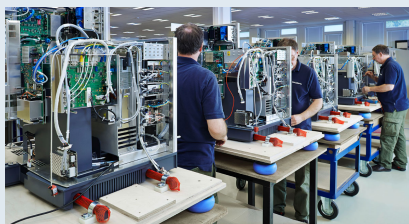


The Project "hazardous ch No LIFE14-EN Programme of the European Union.

FE / FI

Electronics producers substitutes toluene

- Manufacturing of electronic components - mobile and communications network devices, automation system modules, frequency converters, etc.
- Cables were marked using ink printer. Ink and solvent contained VOCs - toluene and butanone - which were easily volatile from the process.
- Toluene - Suspected to be Toxic to Reproduction, other hazards, some uses are already restricted under REACH.



Electronics producers substitutes toluene

- Company performed technological change.
- The new printer is thermal transfer printer which use 2 polymers.



The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.

REACH




LIFE / FIT FOR REACH

Thank you for attention!

juste.kukucione@bef.lt









The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.













LIFE / FIT FOR REACH


Partners



Applinkos Apisaugos Politikos Centras
center for environmental policy







The Project "Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency" (LIFE Fit for REACH, No LIFE14ENV/LV000174) is co-financed with the contribution of the LIFE Programme of the European Union.