

RESPONSIBLE CARE CONSIDERATIONS FOR SUSTAINABLE DEVELOPMENT IN RADIATION CURE MARKETS

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INNOVATING
WITH YOU IN MIND

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SARTOMER
ARKEMA GROUP

LAMBSON

AGENDA

✦ Corporate Social Responsibility

- CSR Definition
- Arkema Commitment

✦ Responsible Care

- History of Responsible Care
- Market Highlights
 - Personal Care
 - Graphic Arts
 - Bio-Based Materials

✦ Summary



CORPORATE SOCIAL RESPONSIBILITY

CORPORATE SOCIAL RESPONSIBILITY



community



economic



environment



workplace

Corporate Social Responsibility (CSR) is a company's commitment to manage the community, economic, environmental and workplace.

CORPORATE SOCIAL RESPONSIBILITY



Responsible Care®

1. A corporate Leadership Culture that proactively supports safe chemical management through the global Responsible Care initiative
2. Safeguarding People and the Environment by continuously improving our environment, health and safety performance
3. Strengthening Chemical Management Systems by participating in development and implementation of lifecycle-oriented, sound-science and risk-based chemical safety legislation and best practices
4. Influencing Business Partners to promote the safe management of chemicals within their own operations
5. Engaging Stakeholders, understanding and responding to their concerns and expectations for safer operations
6. Contributing to Sustainability through improved performance, expanded economic opportunities and the development of innovation technologies and other solutions to societal challenges

Human Rights

- Principle 1: Businesses should support and respect the protection of internationally proclaimed human rights
- Principle 2: make sure that they are not complicit in human rights abuses

Labor

- Principle 3: Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining
- Principle 4: the elimination of all forms of forced and compulsory labor
- Principle 5: the effective abolition of child labor
- Principle 6: the elimination of discrimination in respect of employment and occupation

Environment

- Principle 7: Businesses should support a precautionary approach to environmental challenges
- Principle 8: undertake initiatives to promote greater environmental responsibility
- Principle 9: encourage the development and diffusion of environmentally friendly technologies

Anti-Corruption

- Principle 10: Businesses should work against corruption in all its forms, including extortion and bribery

17 Goals

1. No Poverty
2. Zero Hunger
3. Good Health & Well-Being
4. Quality Education
5. Gender Equality
6. Clean Water and Sanitation
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
1. Climate Action
2. Life Below Water
3. Life on Land
4. Peace, Justice and Strong Institutions
5. Partnerships For the Goals

ARKEMA CORPORATE SOCIAL RESPONSIBILITY POLICY



OUR 3 COMMITMENTS:



Deliver sustainable solutions driven by innovation

- Solutions that address societal challenges
- Innovation at the heart of the activities
- Product stewardship



Manage our activities as a responsible chemist

- Safety of people and processes
- Health
- Environmental footprint reduction



Cultivate an open dialogue and close relations with our stakeholders

- Ethics
- Human rights
- Employee development
- Responsible value chain
- Corporate citizenship

Recognition:   **ROBECOSAM**



6 RESEARCH PLATFORMS DEDICATED TO SUSTAINABLE DEVELOPMENT



New energies

Materials to develop solar power, wind power, and electric batteries

e.g. Kynar® PVDF, Elium® liquid resin



Biosourced materials

Solutions to replace fossil resources as raw materials

e.g. Rilsan® polyamide 11, Pebax® Rnew® elastomer, Sarbio® advanced liquid resins



Water treatment

Materials for water filtration applications

e.g. Kynar® PVDF



Home efficiency and insulation

Solutions to reduce energy consumption of buildings

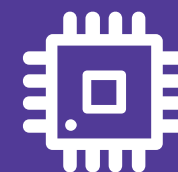
e.g. Bostik® sealant



Lightweight materials

Materials for composites and 3D Printing

e.g. Sartomer® resins, Kepstan® PEKK polymer, Rilsan® polyamide 11



Consumer electronics

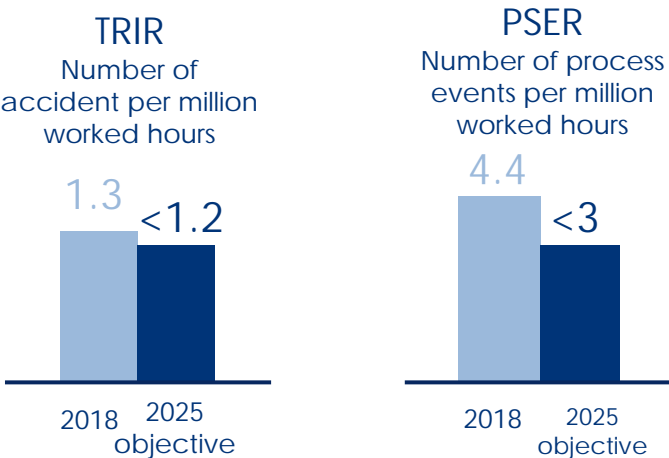
Solutions to bring electronics within everyone's reach

e.g. Piezotech® fluoropolymer

MANAGING OUR ACTIVITIES AS A RESPONSIBLE MANUFACTURER



Safety



- Behavior dimension
- Process safety



Environment

	2018 (compared to 2012)	2025 objectives	(compared to 2012)
Greenhouse Gases	-54 %	-50 %	Achieved
Volatile Organic Compounds	-38 %	-33 %	Achieved
Chemical Oxygen Demand	-41 %	-40 %	Achieved
Net Energy Purchase	-12 %	-15 %	



Arkema is accomplishing a safer work place while reducing environmental impact.

RADIATION CURE BENEFITS



- ✦ Green technology
- ✦ No solvent waste
- ✦ Low hazard

✦ Very low
VOC emissions



- ✦ Process efficiency and flexibility
- ✦ Room-temperature curing
- ✦ Low heat generation
- ✦ Simple adaptation to existing lines
- ✦ Ease of cleaning

✦ 10 times less space utilization
than a conventional drying
oven



- ✦ High productivity and cost savings
- ✦ Reduced cycle time
- ✦ Increased throughput
- ✦ Instant on/off
- ✦ Low energy consumption
- ✦ No solvent waste recycling
- ✦ Minor maintenance cost

✦ 4 times less energy consumption
than thermal curing



SARTOMER RESPONSIBLE CARE®

RESPONSIBLE CARE®

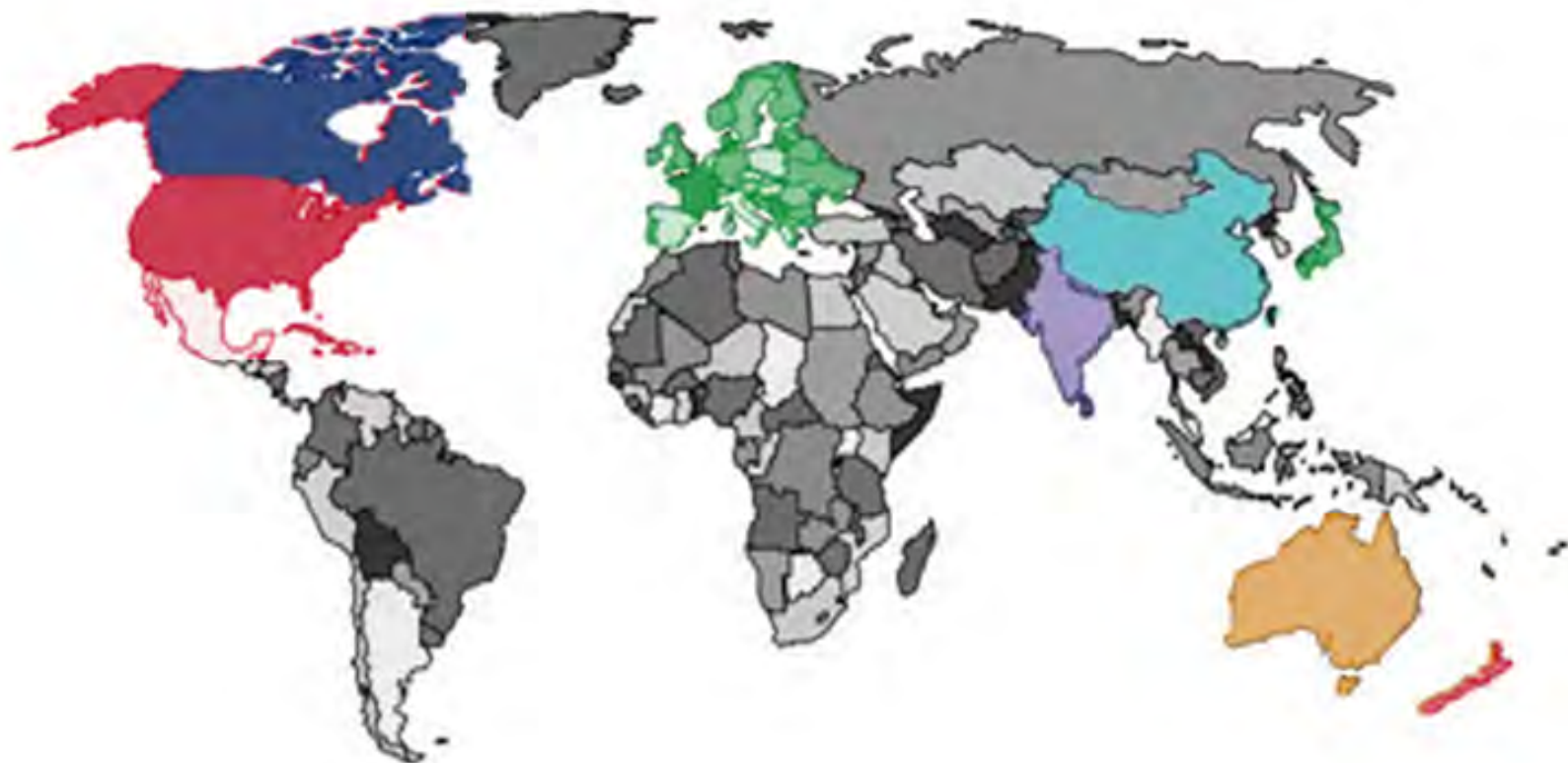
- Global initiative that began in Canada in 1984 that today is practiced by 68 economies around the world.
- Responsible Care® aims to help chemical companies enhance their performance and improve the health and safety of their employees, the communities in which they operate and environment as a whole.



Sartomer has dedicated resources to apply Responsible Care® initiatives within a variety of markets.

REGULATIONS

World Regulation



USA: TSCA, Green Chemistry (CA), Consumer Product Safety

Canada: Chemical Management Plan

EU: REACH, RoHS, WEEE

India: RoHS, WEEE

China: Measures on Environmental Management of New Chemical Substances

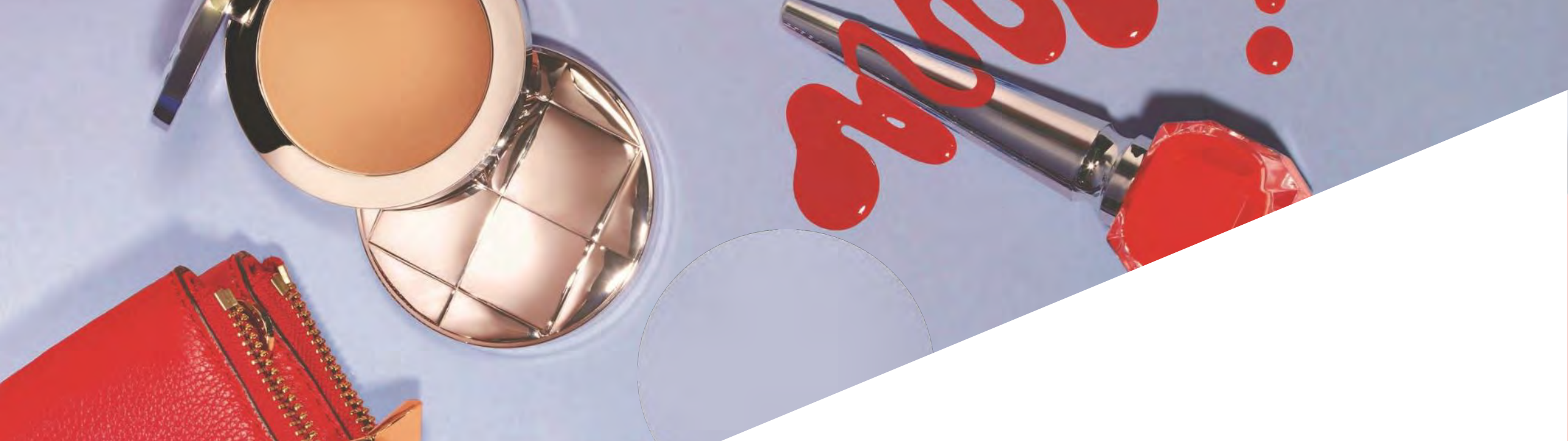
Japan: Chemical Substance Control Law

Australia: National Industrial Chemicals Notification and Assessment Scheme

New Zealand: Hazardous Substances and New Organisms

Korea: REACH

These regulations are constantly changing and evolving, so it is critical to keep up-to-date records at a global level.



COSMETICS & PERSONAL CARE

COSMETICS



■ Regulatory Constraints Europe

- EC N°1223/2009 – Cosmetic regulation in force since July 2013
 - prohibits the use of CMR substances
 - HQ & MEHQ are restricted substances (Annex III)
 - NB: Manufacturers and Importers are responsible for checking compliance with the EU cosmetics laws, including:
 - Assessing and documenting that the product is safe
 - Checking that the product does not contain any prohibited substance



■ Regulatory Constraints U.S.

- Premarket approval is not required, but manufacturers are responsible for substantiating the safety of their products and ingredients before marketing
- FDA does not have the authority to require cosmetic manufacturers to test their products for safety or make their test results available to FDA.
- In the absence of federal oversight, states have taken steps to regulate the safety of cosmetics

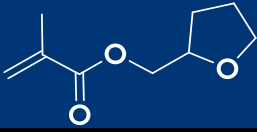
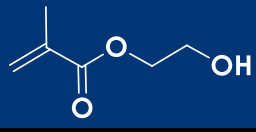


Only 11 substances banned or restricted in Personal Care in U.S. vs. >1300 substances are banned in the EU.

COSMETICS & PERSONAL CARE

■ Responsible Care® Approach

- Globally observe EC N°1223/2009
- Prohibited use of CMR substances
- Restricted use of HQ & MEHQ (Annex III)
- No Sensitizing Category 1 monomers
- Restricted Use of Sensitizing 1B unless the end user develops a final formulation that is not sensitizing

Go Above and Beyond what is required by Regulations

		
Name	THFMA	HEMA
GHS hazards		
Toxicity	Repro Category 1B	N/A
Skin Sensitization	Category 1	Category 1
Irritation	None	Eye 2A
TSCA	✓	✓
REACH	✓	✓
EC N°1223/2009 compliant	✗	✗

Sartomer will not promote products into cosmetics & personal care that do not meet our Responsible Care® guidelines

EXAMPLE – NAIL GEL POLISH



Potential content of (meth)acrylate functionalized materials.

Common Components in Domestic Formulations

Monomers: EMA, HEMA, THFMA, HDDMA, TMPTMA, TMDC, Di-HEMA, HPMA, TEGDMA, EDGMA, IBOMA, and more.

Oligomers: Methacrylate Oligomers, Acrylate Oligomers, Other

Solvents: Nitrocellulose, Ethyl Acetate, Butyl Acetate, IPA and more.

SARTOMER
NAIL CARE
BY ARKEMA

Framework:

Responsible Care®
EC N°1223/2009

Phase 1:

Control
Restricted Use

Phase 2:

Find
Alternatives

Phase 3:

Synthesize
New Materials



GRAPHIC ARTS

GRAPHIC ARTS



■ Regulatory Constraints Europe

- EC N°1935/2004 – Food Contact Materials
 - Outline of processing and testing set forth by EU
- EC N°10/2011- Plastic Regulation
 - Outline for plastic materials and articles intended to come in contact with food
- EuPIA Guidelines for FCM inks and adhesives
 - Any raw material that is classified as “carcinogenic”, “mutagenic” or “toxic for reproduction” CANNOT be used for food contact.



■ Regulatory Constraints U.S.

- FDA 21CFR174-179- indirect food additives and positive list of substances for food contact materials.
- FDA 21CFR181-186- list of prior sanctioned substances in FCM before 1958, and list of generally recognized as safe (GRAS) substances.
- FDA 21CFR170.39- substances in FCM may be exempted by FDA if shown below 0.5 ppb.
 - Overall, FDA says BPA, toluene and more chemicals are still allowed for FCM.



■ Swiss Positive List

- List of materials that are allowed to be used in food contact applications.

■ Nestlé Exclusion/Minimize List

- List of materials that are excluded or should be minimized in use for food contact applications.

Most companies are adopting all these regulations at once for food contact material applications.

GRAPHIC ARTS

NESTLÉ LIST

Chemical	CAS Number
1,4-Butanediol Diacrylate (BDDA)	1070-70-8
Diethylene Glycol Diacrylate (DEGDA)	4074-88-8
Isodecyl Acrylate (IDA)	1330-61-6
Octyldecyl Acrylate (ODA)	2499-59-4
2-Phenoxyethyl Acrylate (PEA)	48145-04-6

Table 1: Nestlé Exclusion List

Chemical	CAS Number
Trimethylolpropane Triacrylate (TMPTA)	15625-89-5
Dipropylene Glycol Diacrylate (DPGDA)	57472-68-1
1,6-Hexanediol Diacrylate (HDDA)	13048-33-4
Pentaerythritol Tetracrylate (PETA)	3524-68-3
Tetraethylene Glycol Diacrylate (TEGDA)	17831-71-9

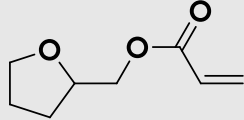




Table 2: Nestlé Minimize List

Sartomer is actively working on delivering safe alternatives for products on the Nestlé List.

GRAPHIC ARTS

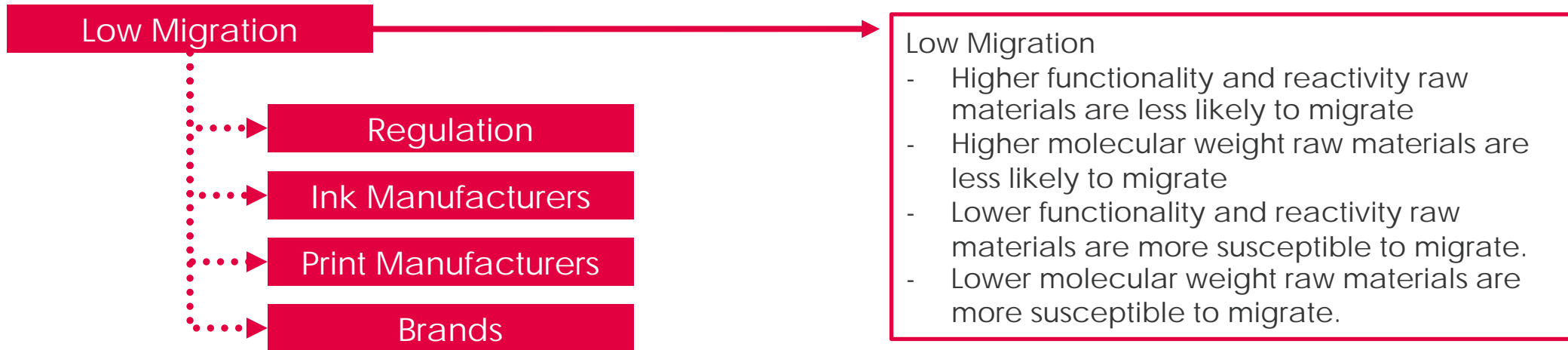
■ EuPIA Guidelines

- Outline of raw material classifications
 - classified as "carcinogenic", "mutagenic" or "toxic for reproduction" CANNOT be used for FCM
 - Classified as toxic or very toxic CANNOT be used for FCM
 - Colorants based on Sb, Ar, Cd, Cr(VI), Pb, Hg, or Se CANNOT be used for FCM
 - All substances must be identified in REACH Regulation
- Testing procedure and migration limits set:
 - 10 ppb for material with insufficient tox data
 - 50 ppb for substances that demonstrate not to be genotoxic
 - >50 ppb if substances have favorable toxicological data

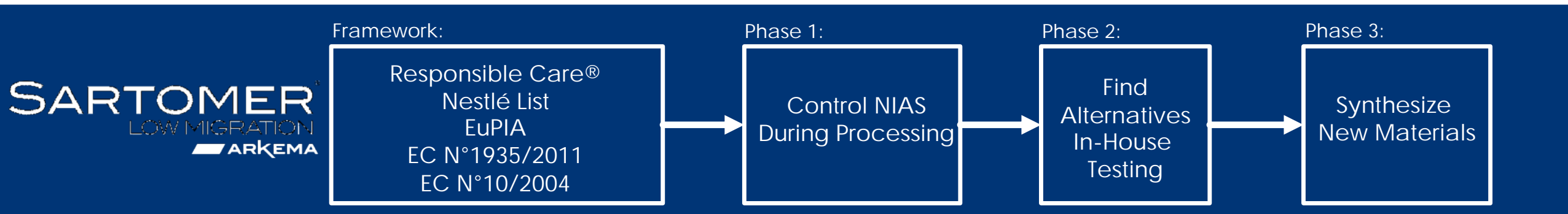
THFA	
Structure	
GHS hazards	
Toxicity	Category 1B
CAS	2399-48-6
Swiss List	
Nestlé	
EuPIA	

As a raw material supplier, it is critical to be aware of each regulation standard.

GRAPHIC ARTS



Proper definition and identification is required when discussing low migration.





BIO-BASED SOLUTIONS

BIO-BASED SOLUTIONS FOR UV/EB CURING

- Growing BioEconomy – Drive for Bio-renewable Materials
 - Sustainably sourced raw materials
 - Aim to convert waste into product
 - Pursue energy independence
 - Mitigate greenhouse gas emissions
- Bio-Renewable Solutions for UV/EB Cure
 - (Meth)Acrylates derived from Soybean, Castor, Pine, Corn, Flax, and others available today
 - Bio-Renewable content (ASTM D 6866) available from 25% to 90%
 - See USDA BioPreferred® Program (biopreferred.gov) for definitions of biobased content
- Challenges
 - Achieving UV/EB curable (Meth)Acrylates with 100% bio-renewable content
 - Registration requirements (TSCA/REACH) of novel Bio-Sourced materials limits options

Sartomer is dedicated to deliver more Bio-Sourced, Sustainable Solutions



Monomers and oligomers combining high quality and technical performances in end-users formulations with an improved carbon footprint

Solutions designed for :



Cure applications



Copolymerization (solution, emulsion, suspension)

SUMMARY



community



Responsible Care[®]
OUR COMMITMENT TO SUSTAINABILITY



THE GLOBAL COMPACT
WE SUPPORT



SUSTAINABLE
DEVELOPMENT
GOALS



economic



SARTOMER[®]
NAIL CARE
BY ARKEMA



SARTOMER[®]
LOW MIGRATION
BY ARKEMA



environment



SARBIO[®]
BY ARKEMA



ARKENERGY
ALL INVOLVED



workplace



safety in action



Overall there are many advantages for being a responsible partner within the industry