

# AkzoNobel Deventer Safety

November 2017

## Introduction

### ↗ **Dennis Nijkamp - Compliance Officer RDI**

Support of the RD&I/COP by developing policies, procedures and guidelines across functions, in line with business needs, AkzoNobel (HSE) strategies and policies, relevant legislation and standards, in order to minimize operational risks, maximize quality and achieve top quartile safety and operational eco-efficient performance.

### ↗ **Key activities:**

- Assure compliance of site permits
- Monitor the compliance
- Develop, manage, implement and maintain compliance systems
- Act as internal consultant

### ↗ **Career at AkzoNobel:**

- Started at AkzoNobel Deventer in 2012 at Manufacturing
- Since 2016 at RDI



# The world of AkzoNobel\*

# AkzoNobel

**€14.2** billion revenue

**€1,502** million EBIT

**€3.87** earnings per share

**80+** countries

**46,000** employees

## Key regions by revenue

North America  
17%

Mature Europe  
36%

Emerging Europe  
7%

Asia Pacific  
27%

## Revenue by Business Area

Decorative Paints	27%
Performance Coatings	40%
Specialty Chemicals	33%

## Revenue by end-user segment

Buildings and Infrastructure	44%
Transportation	17%
Consumer Goods	18%
Industrial	21%

Latin America  
9%

Other countries  
4%

\* All figures are based on year-end 2016



# Surface Chemistry

# AkzoNobel



We are headquartered  
in Chicago

**13** production sites  
**9** RD&I centers  
**5** technology platforms

We're one of the world's leading producers of all types of surfactants. They can emulsify, disperse, clean, wet, aggregate, foam, de-foam, disinfect, soften and more. As a result they're used in a huge range of industrial and consumer products. These include cleaning goods, oil field applications, printing, paints, fabric softeners, asphalt, mining and electronics.

## Key products

**ARMOVIS®**  
STIMULATION SURFACTANTS

**WITBREAK™**  
OILFIELD DEMULSIFIERS

**AMPHOMER®**  
STYLING POLYMERS

**BEROL®**

**Bicstyle®**  
POLYMERS FOR PERSONAL CARE

**ARMOCLEAN®**  
SUSTAINABLE SURFACTANT CLEANERS

## We're used in...

- **Agriculture**
- **Oil and gas**
- **Automotive and transportation**
- **Personal care products**
- **Cleaning products**
- **Construction**
- **Mining**
- **Water treatment**



# Ethylene and Sulfur Derivatives

AkzoNobel



We are headquartered  
In China

16 production sites  
4 RD&I centers  
7 product lines

Our products are used in everyday items such as cleaning products and detergents, food and beverages, interior and exterior building structures, pharmaceutical products, personal care products, as well as vitally important activities such as agriculture, oil and gas recovery, and much more.

## We're used in...

- Agriculture
- Cleaning products
- Food and beverage
- Construction
- Oil and gas
- Pharma
- Personal care products

## Key products

**ELOTEX**<sup>®</sup>

Thioplast G

**Dissolvine**<sup>®</sup>  
master the elements

**AKUCCELL**<sup>®</sup>  
CELLULOSE GUM

**Ferrazone**<sup>®</sup>  
This Iron Works

**Bermocoll**<sup>®</sup>



# Polymer Chemistry

AkzoNobel



We are headquartered  
in Chicago, US

12 production sites  
1 RD&I centers  
8 product lines

We produce everyday essentials for the global polymer and electronic industries including organic peroxides, metal alkyls, organometallic specialties and polymer additives.

#### We're used in...

- **Plastics and resins**
- **Rubbers**
- **Composites**
- **Pharma**
- **Electronics**

#### Key products

**Butanox®**

**Trigonox®**

**Perkadox®**



# Industrial Chemicals

# AkzoNobel



We are headquartered  
in the Netherlands

We provide essential ingredients for a range of industries as Europe's largest producer of high purity salt and a leading supplier of chlorine, caustic lye, hydrochloric acid, chloromethanes and MCA.

**We're used in...**

- **Plastics**
- **Pharma**
- **Food and feedstuffs**
- **Transportation**
- **Construction**
- **Cleaning products**

**11** production sites  
**1** RD&I centers  
**5** product lines

**Key brands**



# Pulp and Performance Chemicals

AkzoNobel



We are headquartered  
in Sweden

31 production sites  
2 RD&I centers  
5 product lines



Our bleaching solutions are essential to paper and cardboard industries worldwide, while our colloidal silica solutions, expandable microspheres and silica-based chromatography concepts help enhance people's lives. Examples are tissues, diapers, packaging, shoe soles, automotive coatings and sealants, smartphones, champagne corks, LED lamps, etc.

## Key products

**Levasil** Colloidal Silica  
**eka** **Kromasil**  
**Expancel**

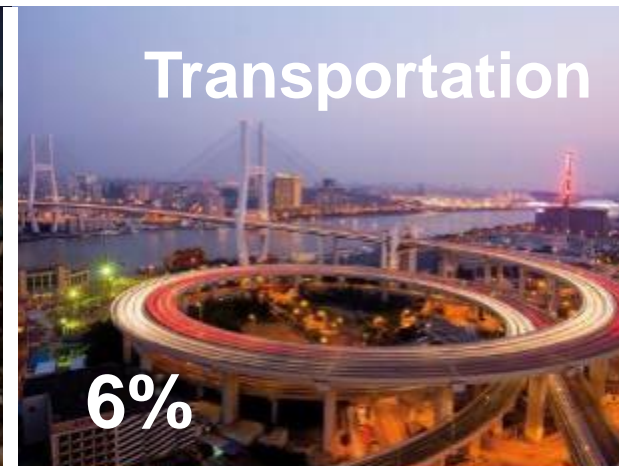
## We're used in...

- Pharma
- Personal care
- Packaging
- Water treatment
- Plastics
- Electronics
- Construction
- Food and beverage
- Transportation



**Our products can be found  
almost everywhere**

Revenue by end-use sector



**Look around you**  
Chances are you'll see our influence

**AkzoNobel**





## Polymer Chemistry Deventer



### Manufacturing Polymer Chemistry

- Multiple organic peroxides production plants
- Since 2015: production plants are relocated to other Polymer Chemistry sites
- Production closure end of 2017
- Logistic warehouses will continue supporting the Polymer Chemistry Business Unit



# Research Development & Innovation Deventer

**AkzoNobel**



## Specialty Chemicals RD&I:

- A knowledge center with more than 200 highly qualified R&D employees.
- Several BU teams: product-, process- and market innovations.
- Corporate teams of scientists organized into the Expert Capability Group. The ECG services AkzoNobel businesses worldwide.
- The Complex Organic Plant (COP) is a small production facility for pilots (upscaling)
- COP also manufactures products on a commercial basis.

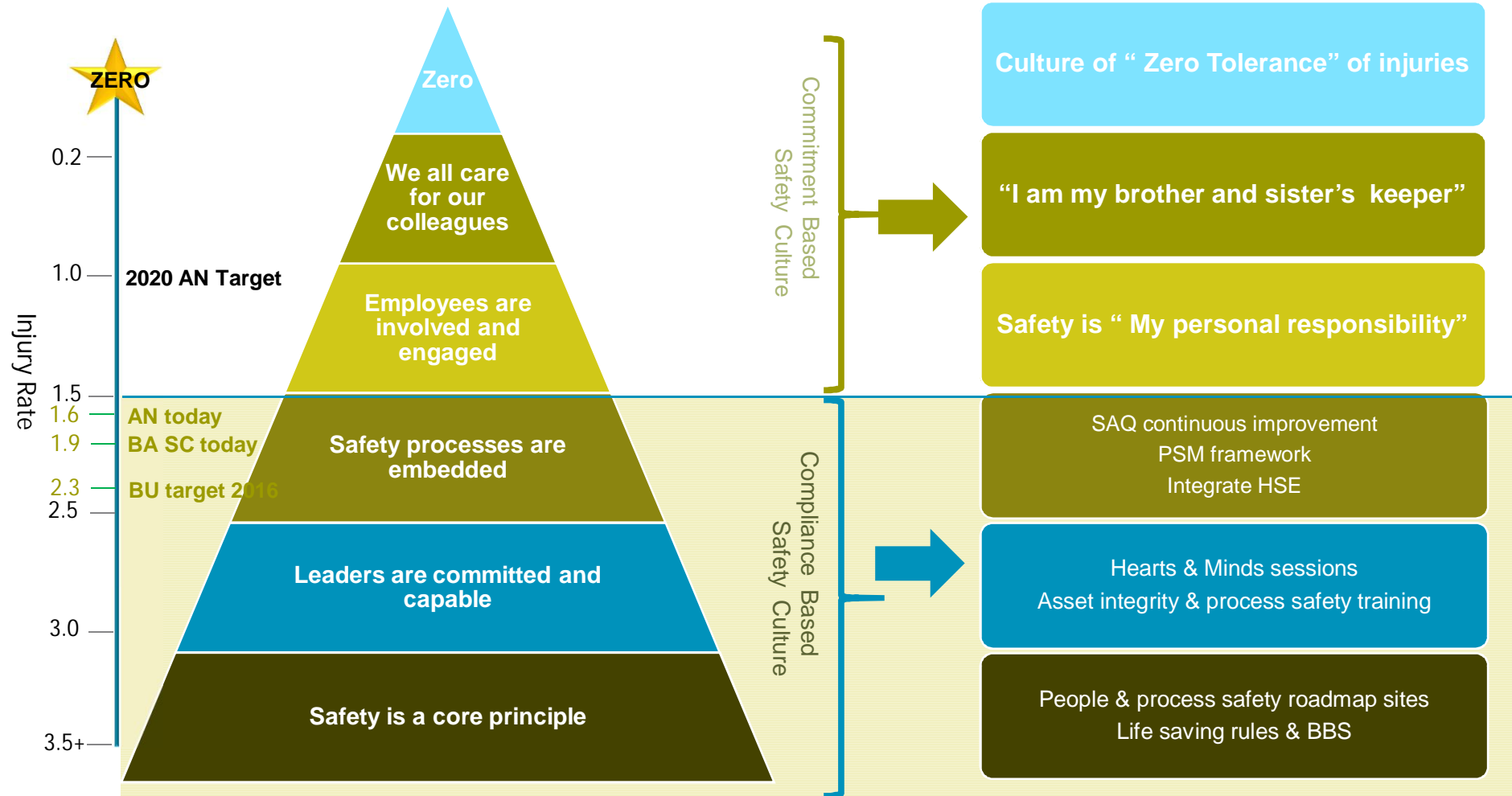




## Safety: Our number one core principle



## Safety excellence objectives





# Deventer Safety

We work in a safe way or we do not work!

**AkzoNobel**



## Deventer Safety

### ↩ RDI activities:

- The laboratory experiments and production concern physical and chemical processes.
  - Small scale activities – bench size
  - Medium scale activities – fume hood setup
  - Large scale activities – pilot plant
- Work is being performed using toxic, carcinogenic, oxidizing, explosive, thermic unstable compounds.
- Continuous safety measures are required in order to protect people and safeguard the prevention of fire and/or explosion and environmental pollution.

### ↩ Deventer location is a SEVESO site:

- Extensive regulations regarding the prevention and control of major hazards
- Internal and external safety
- Be aware of the risks of working with and storage of dangerous substances
- Know how the risks can be controlled and prevent the effects of a major incident



## Major incidents and control

### ➤ Major incidents:

- An uncontrolled scenario
- Dangerous substances involved
- Serious consequences for people's health and environment
- Examples: fire, explosion, release of toxic substances or gasses.

### ➤ Example of decomposition of organic peroxides:

- AkzoNobel safety video: <https://www.youtube.com/watch?v=OrGXltyUvFc>
- Self decomposition example: <https://www.youtube.com/watch?v=98jOeCr06Xs>

### ➤ Control measures:

- Important safety measures called Critical Lines Of Defence (LOD)
- Two types: preventive and repressive
- Technical measures (pressure relief, sprinkler)
- Organizational measures (procedure, training)





## Safety of experiments

### ➤ Risk assessment of activities:

- Notification of experiment (NOE)
- Description of experiment (activities, substances, conditions)
- Control measures
- Formal approval
- Visibility at workplace

### ➤ Occupational health risk management:

- Part of NOE and in addition to SDS
- Determine exposure hazards chemical substances for employee
- Control measures

### ➤ Generic safety principles

- Stop work if conditions are unsafe! -> Life Saving Rules
- Critical LODs must be in place and operational
- Follow the NOE and HSE instructions

Notification of Experiments		
<b>Administrative &amp; organisation</b>		
Name experiment(s)	a) b) c)	Project number
Experimentator(s)		Notification number
Department		Project Leader
Number of experiments		Location of activities
Experiment continues outside office hours		Start date
Telephone at work	a) b) c)	Valid until (max. 24 months)
		Mobile/Home phone
<b>Chemical equations / experiment description</b>		
<b>Equipment / utilities</b>		



## Storage safety

### Storage conditions:

- Maximum storage per location is monitored
- Use of dedicated packaging
- Depending on the chemical properties substances are stored separated
- Construction of storage
- Fire protection systems
- All personnel trained in storage safety (PGS15)



## External safety

### QRA:

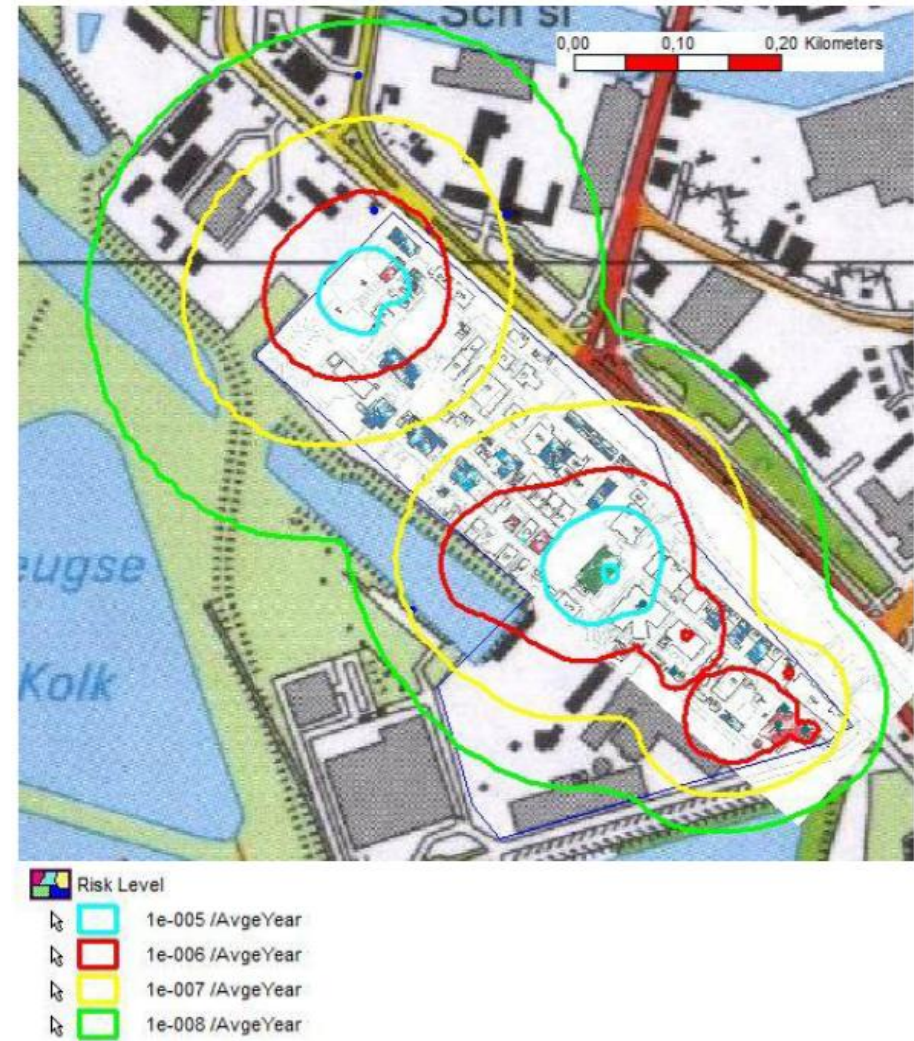
- Based on national legislation (BEVI) a QRA is available
- Storage toxic compound (PCl<sub>3</sub> and gascylinders)
- PGS15 storage (>10 ton)
- Existing storages (risk sources) are permitted

### Localized risk contour:

- Normative: 10<sup>-6</sup> contour
- 1 person lethal injured once per 1.000.000 year
- Within 10<sup>-6</sup> and 10<sup>-5</sup> restrictions to vulnerable objects

### Information available for public:

- [www.risicokaart.nl](http://www.risicokaart.nl)

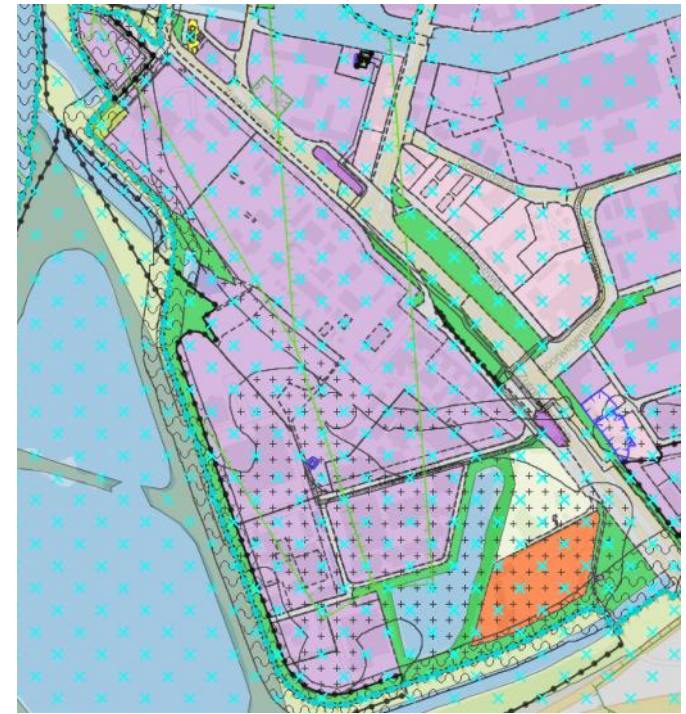




## External safety

### ▮ Spatial planning:

- Land use plan “Bergweide, Kloosterlanden – Hanzenpark, Veenoord”
- AkzoNobel situated on section “Veenoord/Bergweide 5” of land use plan
- AkzoNobel industry category 5.2 (SEVESO site)
- Environmental zoning applicable of 700 meters (Bedrijven en milieuzonering (Infobron: SDU 2009)
  - Separation between objects with environmental impact and vulnerable objects
- External safety regulations can be barrier for development



## What if...emergency situation

- **How does the organization respond to emergency situations:**
  - 24/7 company fire brigade
  - 24/7 emergency staff on call
  - Emergency response plan
    - Internal scenarios (fire, explosions, loss of containment, injury)
    - External scenarios (flooding, terrorism)
  - Frequent internal exercises and exercises with regional fire brigade



## Sharing our safety expertise

- Classroom review of safety and handling of our products
- Consultation on storage and dosing facility design
- Demonstrations on the safe use, handling and control of our products
- On-site assistance and advice regarding safety procedures





**AkzoNobel**

Questions?