



Environmental report  
Sege site 2005-2006

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## A hundred years of paint

**The Sege site, located outside Malmö Sweden, is Scandinavia's largest site for the development, production and sale of paint, varnish and fillers. The site operates through two companies, Akzo Nobel Decorative Coatings AB and Akzo Nobel Industrial Coatings AB, with one environmental permit dating from 1999.**

Both companies share the same historic roots. Nordström & Sjögren AB, a retailer and wholesaler of paint, varnish etc., was founded in Malmö in 1903. The company, succinctly called Nordsjö, gradually started its own production, which was transferred to the Sege site in 1948. Nordsjö still remains a strong trademark on the professional painting and DIY markets.

The Sege site had a production volume of almost 56 million litres in 2004, of which approximately half was exported to foreign markets. The site has an area of 270,000 m<sup>2</sup>, including a covered area of approximately 70,000 m<sup>2</sup>. The business has 570 employees, of which two thirds work for Decorative Coatings. Akzo Nobel Decorative Coatings AB is principally responsible for the site, and is in charge of joint services in the areas of engineering, environment, security, staff and certain administrative functions.

Akzo Nobel is organised in business units (BU). Four business units operate at Sege: BU Decorative Coatings Europe, BU Decorative Coatings International, BU Industrial Finishes and BU Car Refinishes.

### **37 million litres of consumer paint**

In 2004, Sege had a production volume of 37 million litres. This included 23 million litres of water-borne paint, 6 million litres solvent-borne paint and 8 million litres of fillers. Production took place at the following units:

- MF 2 – white water- and solvent-borne products in large batches.
- VF – water-borne white and coloured products and clear varnishes.

- AF – solvent-borne white and coloured products, clear varnishes and tinting pastes.
- GF – ready mixed fillers.

The products are sold to the professional painting and DIY markets in Sweden and the rest of Scandinavia, the Baltic States and other countries. The biggest trade-marks are Nordsjö, Sadolin and Casco. Our warehouse processes 3,200 articles, as well as a further 3,200 accessories that are sold through Färghandelskompaniet.

Akzo Nobel Decorative Coatings in Sege (then called Nordsjö AB) gained ISO 9001 quality certification in 1993, and was granted a new ISO 9001:2000 certificate in January 2003.

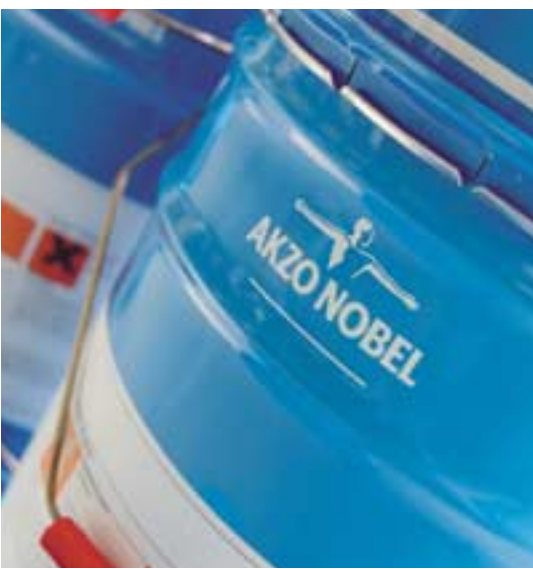
### **19 million litres of industrial paint**

Sege had a production volume of 19 million litres in 2004, including 13 million litres of paint and varnish and 6 million litres of resins, primarily for use within the Akzo Nobel group. Production of the following takes place:

- Large batches, pigmented products
- Small batches, pigmented products and clear varnishes
- Clear varnishes, thinners, hardeners and water-borne wood varnishes
- Resins

The products are sold to the international industrial painting industry through the Industrial Finishes business unit and Car Refinishes. The warehouse processes more than 1,000 articles.

Akzo Nobel Industrial Coatings in Sege gained ISO 9001 quality certification in 1991, and was granted a new ISO 9001:2000 certificate in March 2003.



# Our products should create a beautiful and sustainable environment

**Our environmental policy is a fundamental element of our business. It indicates our targets and level of ambition. Our environmental policy applies to all our business at the Sege site. All employees are responsible for applying it in our daily routines.**

## **Our environmental policy**

- We shall have a proactive approach towards environmental issues. Prevention of damage to health and environment will be a natural feature of our work. The products and services we supply shall meet the customers demands, needs and expectations of products that are safe and environmentally adapted.
- We shall realise a targetoriented development by means of continuous improvements and prevention of pollution to minimise the impact on the environment, health and safety of our products, manufacturing and handling. Laws and regulations shall be seen as our minimum level.
- Care for health and environment shall concern all our employees in their daily work.
- We shall show honesty and openness with all our external contacts.
- We shall actively work together with our suppliers and other interest groups towards a sustainable development.

## **Our environmental management system, ISO 14001**

In December 1996, both companies were accredited to the international environmental management standard ISO 14001. We were among the first ten companies in Sweden to receive a certificate of accreditation to this International Standard. The certificate demonstrates that we take the environmental issues seriously and work with continuous improvements to reduce the environmental impact of our activities at every stage of the process.



# Implementing our environmental policy

**For many years, we have made systematic and committed efforts to improve our environmental performance. After achieving each target, we have set new ones. We regard our environmental policy as a continuous process.**

In order to implement our environmental policy, it needs to be converted into practical measures. The company management has established a set of environmental targets to clarify our environmental efforts, so that we can measure and follow up the results. Our first set of environmental targets was for the period 1995–2000. We have achieved these targets, and have set new targets for 2001–2005

## Environmental targets

## Results

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The number of environmentally approved suppliers shall amount to 85 percent in 2005.

Target achieved.  
100 percent of our evaluated suppliers 2003 were environmentally approved. We maintain an ongoing dialogue with our suppliers and a new supplier evaluation with higher demands is due in 2005.

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Discharge of COD in waste process water shall be below 0.2 kg/m<sup>3</sup> paint in 2005.

Target achieved.  
COD emissions totalled 6.6 tonnes in 2004, equivalent to the target 0.2 kg COD/m<sup>3</sup> paint.  
This target will continue to apply, since changes to production that may affect COD emissions will continue until 2005.

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Emissions of solvents to air shall be reduced by 10 percent during the period 2001–2005 (baseline 2000).

Target achieved.  
Emissions from our production site was 26 tonnes in 2004. We have reduced emissions by 90 percent since 1989. Measures implemented to achieve this target included improved cleaning equipment, ventilation and production changes during the year.

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Raw materials with environmental impacts shall be substituted according to an established action plan.

Target partly achieved.  
An action plan was drawn up for 2001–2005. The work is conducted in close collaboration with our laboratories and our customers. During 2004 the use of toxic substances, lead, chromium, tin, zinc and copper was reduced.

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Waste quantity per litre of paint produced shall be reduced by 15 percent in the period 2001–2005 (baseline 2000).

Target not yet achieved.  
The total amount of waste has decreased in 2004, as has the amount of waste per produced litre of paint. Compared to the target the levels are still too high.

# Paint has many components – just like our environmental efforts

**We are responsible for the environmental impact of our products throughout their entire life cycle, from raw materials to waste. This means that we actively take responsibility for our products and make environmental demands on our suppliers.**

We handle approximately 1,200 different raw materials for paint production, as well as roughly 120 auxiliary chemicals. The raw materials can be divided into the following main groups, according to their function in the paint:

- **Resins** bind the paint and fix it to the surface. The most common binders are polymers (such as polyacrylate and polyvinyl acetate), or oils/alkyds, which may be either vegetable or synthetic.

We produce our own resins through chemical reaction of alcohols, fatty acids/oils and acids at approximately 230°C for 24 hours. After this, the resin is diluted with solvents before being delivered to the users. We use our resins for our own production, and also sell them on to other units in the Akzo Nobel group.

- **Pigments** and fillers give the paint its colour and coverage. Pigments may be either synthetic or natural. Our most common pigments include titanium dioxide, iron oxide, carbon and various organic compounds. Our fillers include various minerals such as chalk, dolomite, talc, sand and kaolin.
- **Solvents** give the paint the consistency required for application to the intended surface. The most common solvent is water. Besides water, we use white spirit, xylene, various types of alcohol, esters and glycols. We try to use aliphatic white spirit without aromatic hydrocarbons wherever technically possible.
- **Additives** give the paint specific properties, and usually constitute less than 5 percent of the finished product. Our additives include thickeners, antifoaming agents, surfactants, drying agents and biocides. Biocides prevent the growth of bacteria and other micro-

organisms in the paint and protect against algae and fungi, making the finished coat more durable.

- **Auxiliary chemicals** are all other chemicals that are not used directly in the products. These include machinery oils, detergents, cleaning agents and workshop chemicals.

## Product stewardship

We supply our customers with information on our products. As far as possible we do so for the product's entire life cycle.

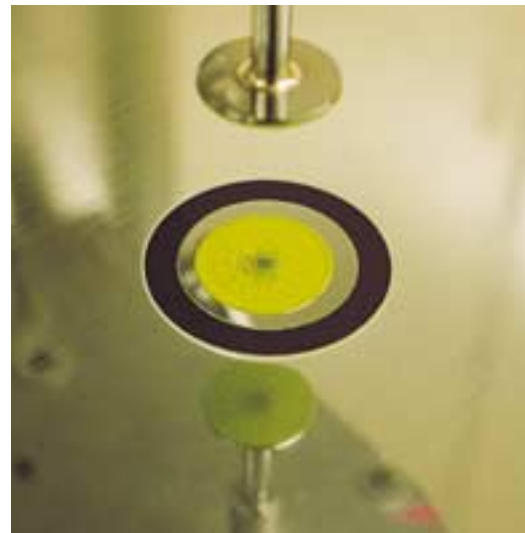
We prepare internal safety information for all our raw materials and auxiliary chemicals, based on their assessed health and environmental impact. In addition to providing safety data sheets and environmental declarations for our products, we also measure the emissions from dry coats of paint to find out which substances evaporate. We want to ensure that both our staff and our customers know how to safely handle the various substances and products.

## Raw material suppliers

To reduce the environmental impact of our finished products, it is necessary to start with the raw materials. Buying raw materials that are free of undesirable contaminants such as heavy metals, we reduce the environmental impact of the finished product. This means making environmental demands on potential suppliers and choosing suppliers with active environmental programmes.

Life cycle analyses may help when developing products and choosing raw materials. A large collaborative industrial initiative for life cycle analyses of paint showed the following results:

- Paint prolongs the product's life span (positive environmental impact).
- Raw materials, production and use are the biggest contributors to the paint's negative environmental impact.
- The environmental impact of paint includes greenhouse effect, formation of ground-level ozone, acidification and eutrophication.





# Reducing the environmental impact of our raw materials

Some of the raw materials we use in our products can be harmful to humans or the environment. Many of our customers make high demands on the function and durability of our products. When advising customers, we always seek to suggest the best product choice from both a functional and environmental perspective.

An important way of reducing a product's environmental impact is to focus on the environmental aspects right from the product development stage. Much of our product development is done in close collaboration with our customers, with the aim of reducing our customers' emissions through advice and correct product choice.

We have prioritised a selection of substances that we actively try to replace in our products. The selection is based on demands and requirements from Swedish environmental authorities.

### Prioritised substances for replacement:

- CMR substances
- Toxic or environmentally hazardous substances
- Alkylphenolic ethoxylates and phthalates
- Organic solvents
- Aromatic solvents
- Heavy metals
- Selected biocides

### Results – replacement of unwanted substances:

Substance	Reduction (%) 2000 – 2004
Chlorinated paraffins	100
Chromium (VI)	100
Phthalates	100
Toxic substances	96
Chromium	74
Alkylphenolic ethoxylates	70
Zinc	69
Hazardous to environment	39
Lead	38
Aromatic solvents	30



### How does paint affect the air quality in homes?

In 2002, a collaborative industrial analysis was conducted to determine the effect of paint on air quality in homes. The results showed that there is

no evidence that the air in rooms painted with modern low-emission paint is dangerous. For further information, see SP Report 2002:19.

# Our products and environmental labelling

Our customers should have confidence in the company and our products. We work to ensure that our products meet the requirements for positive environmental labelling.

Most of our indoor products meet these requirements. The criteria are revised once every five years, and were last updated in 2002.

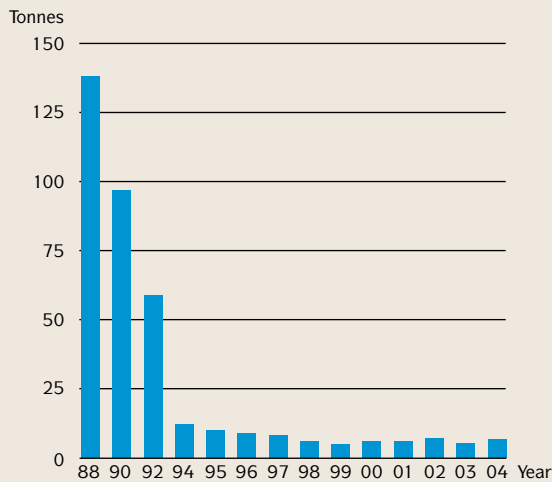
The EU Ecolabel – The European environmental label, the EU flower, includes requirements in the following areas:

- Product function
- Low content of organic solvents
- Low content of toxic substances, heavy metals and other environmentally hazardous components
- Information on waste management

**Recommendation by the Swedish Asthma and Allergy Association –**  
A group of experts examines the product's content and the results from tests of emissions (volatile substances that evaporate) from a dry coat of paint. Measurements are done after 4 and 26 weeks, to ascertain whether the product can be recommended for asthma and allergy sufferers. Most of our indoor products meet these requirements.



## Emission history - water (measured in tonnes of COD)



# The art of protecting the environment without compromising on quality

**We focus strongly on optimising our paint production processes by reducing air and water emissions and energy consumption.**

## Paint is manufactured in three stages:

- Weighing and premixing  
The raw materials are weighed, mixed and finely distributed to make a thick paste.
- Completion and adjustment  
Further raw materials are added to give the paint its final properties, and the colour is adjusted.
- Filling and packaging  
The checked and approved product is distributed in the appropriate packages. The choice of packaging may depend on the properties of the paint and the customers' requirements. Common forms of packaging include containers, drums, buckets or small tins.

## Reduction of water emissions

The production equipment used for paint manufacturing must be cleaned between changes in products or colours. The resulting cleaning water contains small amount of paint. We aim to recycle the cleaning water in our production wherever possible. If this is not possible the water is treated and purified before

being sent to the municipal treatment site. Otherwise, it might disrupt the processes at the treatment site.

The cleaning water is purified in two stages, through chemical precipitation and biological treatment. Chemical precipitation means adding a special chemical so that the metal and paint remnants form a sludge, which can be disposed of subsequently. Chemical precipitation eliminates over 95 percent of the metals and 50–70 percent of other undesirable substances. After this, the water is conducted to a biological treatment system that was introduced in 1998. Here, the rest of the substances are broken down by microorganisms. Finally the water is sent to the municipal treatment site. As a result of the recycling and purification activities, we have reduced the contamination level of the process water by 95 percent since 1988.

The process water is tested through regular sampling. The results are reported to the environmental authorities. In 2004, we emitted a total of 1.200 m<sup>3</sup> of process water containing 6,6 tonnes of COD to the municipal treatment site. Our license permits a maximum of 10 tonnes of COD per year.

## Reduction of air emissions

**Dust** – A large share of our raw materials are handled in powder form. All dust-contaminated air passes through dust filters. The condition of the filters is

checked regularly, and their efficiency is also checked through annual test measurement. The measurement results are reported to the environmental authorities. Normally, the air contains less than 3 mg dust/m<sup>3</sup>. The authorities allow a maximum of 10 mg/m<sup>3</sup>.

**Solvents** –The processing of organic solvents generates air emissions of solvent. Organic solvents combined with sunlight and nitric oxide, for instance from car exhaust fumes, contribute to creating ground-level ozone. Ground-level ozone can be harmful to humans, buildings and plants.

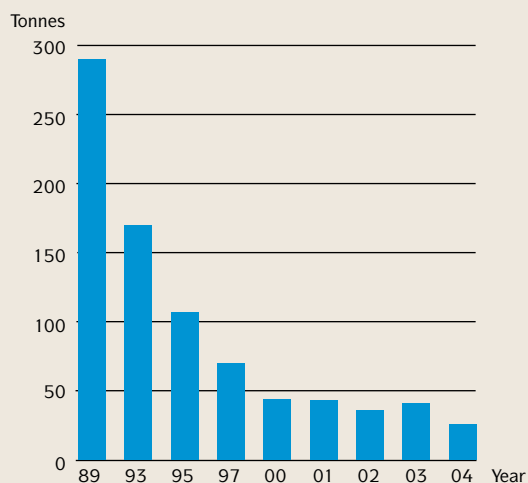
Our efforts to reduce solvent emissions began by replacing the organic solvents in our products with water. We then went on to tackle the problem at source level, by choosing technical solutions and closed systems to prevent the occurrence of emissions. Measures have included the use of optimised ventilation systems, the conversion of tanks and process equipment and staff training initiatives.

This enabled us to reduce our solvent emissions from 290 tonnes/year to 26 tonnes/year (90 percent) during the period 1989–2004.

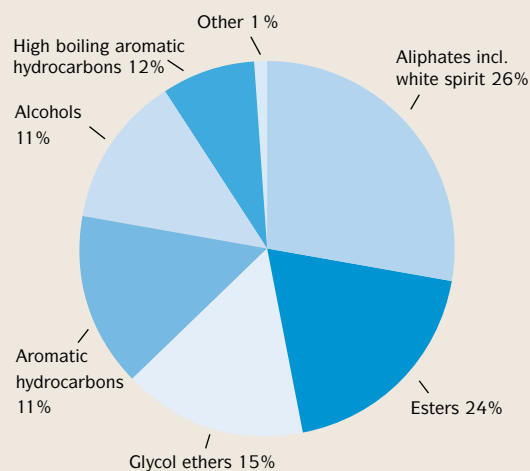
We monitor solvent emissions through a measurement programme that includes monthly sampling as well as continuous measurements at the main emission points. The results are regularly reported to the environmental authorities.



### Emission history – air (measured in tonnes of VOC)



### Distribution of solvents



#### Industrial paint

Most (80 percent) of the solvent emissions from the site are generated through our industrial paint production. The industrial painting industry makes significantly higher demands on the products in terms of special properties and durability, and for this reason, some of our industrial products still contain organic solvents. Industrial painting is often done automatically through spray boxes, curtain coating or roller coating. We aim to replace products that still contain solvents with powder pigments, water-borne or photocurable systems, or products with a lower solvent content (high solids).

In 1999, we installed a thermal incineration system for the treatment of solvent emissions from our industrial paint production. The incinerator has a purification capacity of over 95 percent, and transforms solvent emissions into carbon dioxide and water.

#### Consumer paint

The remaining 20 percent of the solvent emissions comes from decorative coatings production sites for solvent-borne paint. Wherever possible, organic solvents have been replaced with water. In cases where the function of a product must meet specific demands for durability, we endeavour to use solvents with the lowest possible environmental impact, for instance by choosing alcohols and glycols instead of white spirit. We also introduce

new, water-borne systems on the market as an alternative to solvent-borne systems.

#### Energy

- Natural gas 14,904 MWh
- Electricity 12,300 MWh
- Municipal water 33,887 m<sup>3</sup>

Together, this equals the energy consumption of approximately 1.100 single-family houses and the water consumption of approximately 100 average households. Through an ongoing saving energy action programme, we have reduced our energy consumption per litre of paint by 30 percent since 1995.

## More than paint

We are under increasing pressure to improve our environmental performance. Demands are made by various groups in society, including authorities, customers, the media and people in our local environment. We actively aim to solve both major and minor environmental issues in our business.

Regular risk assessments have identified a large scale fire as a potential environmental risk.

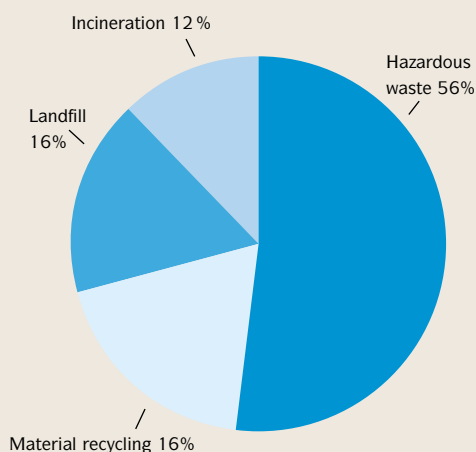
The Sege site has its own industrial fire brigade with access to two fire engines and a decontamination truck that can be used for fires or large chemical leakages. Approximately 2,000 smoke and heat detectors are installed throughout the site area. Our surface water drainage system is equipped with automatic, remote controlled gate valves, to prevent extinguishing water from flowing into the River Sege in the event of a major fire.

We constantly work to reduce the environmental impacts of all our activities to ensure the credibility of our environmental work. This means that environmental consciousness is part of the daily routines and decisions in all our departments.

Our environmental initiatives have included the choice of environmentally friendly office material, office furniture and cleaning chemicals and the environmental adaptation of our canteens. These initiatives contribute to spreading environmental awareness to all our employees.

Nobody can do everything – but everybody can do something for the environment!

## Distribution of waste, 2004



## More paint, less waste

Paint production generates various types of waste. We separate our waste in different categories to dispose it in the best possible way. Our target is to produce less waste per litre paint.

Our waste can be divided into two principal categories:

- **Hazardous waste**, which must be sent to regulated incineration (SAKAB) for destruction. Examples of hazardous waste include liquid paint residue, solvents, alkaline waste, laboratory chemicals and machinery oils

- **Other industrial waste**, which can either be recycled, dumped on landfill or incinerated through a standard community incinerator for household waste. Examples of industrial waste include empty packaging, pallets, metal, soft plastic, paper, glass and corrugated cardboard.

We collaborate with our customers and suppliers to develop various recycling systems for packaging material, such as containers and big-bags.

Waste volumes (tonnes)	2004	2003
• Hazardous waste	1,931	1,834
• Waste to landfill	555	643
• Waste to incineration	433	434
• Material recycling	540	602

In 2004, the positive trend from 2003 continues, and the volumes of waste were reduced. Actionplans and efforts to reduce our waste volumes are ongoing. We investigate the possibilities to treat more waste internally instead of external destruction, for example sludge and waste water.

## Recycling of empty paint containers

Our packaging material can be recycled. Both companies are linked to the national register (REPA) to ensure that the material in our empty packages is collected and recycled in an environmentally correct way.

Our most common packaging materials are steel, polypropylene and polyethylene.

### Decorative Coatings

The finished product is packed in metal or plastic containers, in various sizes depending on the customers' requirements (100 ml up to 20 litres). Today, most Swedish municipalities have implemented systems to collect empty paint containers and left-over paint products

from consumers and the professional painting industry.

### Industrial Coatings

Our industrial paint products are delivered in a variety of packages, depending on customer requirements. The most common packages are containers, drums and buckets (20 litres), but we also use bulk transport.

In collaboration with our customers, we have developed various recycling systems for used packaging, to reduce the environmental impact and minimise the need for cleaning.

## Collective transports

We purchase our raw materials from Europe (85 percent), the US (10 percent) and Asia (5 percent). We received about 8,500 raw material deliveries in 2004, all by truck. About 49,100 deliveries of finished products were made from our site in 2004. We always try to optimize our loading space utilisation and to use integrated transports.

We perform environmental evaluations of our haulage providers, and choose haulage companies with active environmental programmes.

Life cycle assessments of paint have shown that transport has a minimal effect on the overall environmental impact of our paint products.



## A long history of environmental management

**2004** VOC-emissions reduced by production and process changes

**2003** Projects to reduce waste volumes continues

**2002** Reducing VOC-emissions by process and ventilation improvements

**2001** External audit of our water treatment and the incinerator

**2000** An Akzo Nobel Health-Safety-Environment audit was performed. The overall result was positive.

**2000** Three persons trained as Dangerous Goods Safety Advisors

**1999** Installation of a thermal incinerator for Industrial Coatings

**1999** New permit from environmental authorities

**1998** Installation of biological water treatment for process water

**1997** Approval by the Asthma and Allergy Association on indoor paint (number one in Sweden)

**1997** Safety valves installed on surface water to prevent the recipient in case of accidents

**1996** EU's ecolabel on indoor paint (number 1 in Europe)

**1996** ISO 14001 certificate for both companies

**1995** An external HSE-audit performed

**1994** New permit from environmental authorities

**1993** Installation of chemical water treatment for water-borne paint

**1984** Installation of chemical water treatment for industrial paint

**1938** Nordsjö develops the first water-borne paint

## Environmental glossary

### Biocide

Chemicals that prevent the growth of microorganisms, fungi, algae or mould in paint or dried paint coat.

### CMR substances

Substances suspected of being carcinogenic, mutagenic (altering cell DNA) or damaging to reproduction.

### COD

Chemical Oxygen Demand. Used as a measurement of the amount of oxygen required to break down organic substances in waste water.

### Emission

Emission and/or evaporation into external, working or living environments.

### Chemical precipitation

Method for purifying water through the addition of special chemicals, which cause metals and other materials in the process water to collect into larger particles. These particles sink to the bottom as sludge, leaving purified water (clarification).

### Ground-level ozone

An aggressive form of oxygen generated by the effect of the sun's rays on atmospheric pollution and hydrocarbons. Ground-level ozone is harmful to health, plants and building material.

### Thermal incineration system

Method for purifying air by heating up solvent-contaminated air in a ceramic bed in the presence of oxygen. The solvent is oxidised into carbon dioxide and water.

### Heavy metals

Lead, copper, chromium, cadmium, zinc and tin. Most heavy metals are known to be environmentally harmful, and can accumulate in the food chain causing serious health damage.

### VOC

Volatile organic compounds, a collective term for various organic solvents.



## Paint and the environment

Paint has a positive impact on the environment, by making our surroundings more attractive and protecting and preserving painted surfaces.

However, all industrial activity has some degree of negative environmental impact, and paint is no exception.

This environmental report explains how we deal with environmental issues at the Akzo Nobel site in Sege outside Malmö in Southern Sweden.

We make constant efforts to satisfy our own and others' demands to reduce the negative environmental impact of our business and products.

### **Facts about the Sege site**

- Paint production started in 1948
- The site produced 56 million litres of paint in 2004
- Total site area of 270,000 m<sup>2</sup>
- Two companies: Akzo Nobel Decorative Coatings AB and Akzo Nobel Industrial Coatings AB
- Four business units: Decorative Coatings Europe, Decorative Coatings International, Industrial Finishes, Car Refinishes
- Customers: professional painting, product coating, DIY
- Both companies are certified according to ISO 14001 and ISO 9001:2000

Akzo Nobel, based in the Netherlands, serves customers throughout the world with healthcare products, coatings and chemicals. Consolidated sales for 2004 totaled 13 billion euros. The Company currently employs approximately 61,500 people in more than 80 countries. Akzo Nobel has roughly 4,300 employees in Sweden, in some 30 locations.

For further information, please contact our Environmental Controller or Information Manager.

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