



Environment, Safety, Health

Henkel *Facts and figures for 1998*

Sustainable development is a clear objective of the Henkel Group's corporate policy. We are convinced that sustainable development can only be achieved by the joint, concerted efforts of all social groups. An open and constructive dialogue between the players is a basic precondition for this.

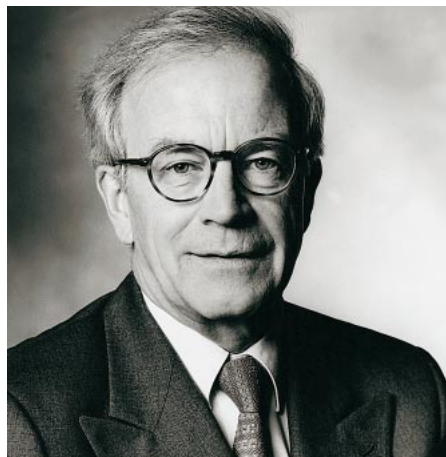
Henkel wants to take the initiative in encouraging this dialogue. One example of how it is doing so is its annual report on safety, health and environmental protection in the Henkel Group. This is the eighth such publication that has appeared.

A central element of the 1998 report is the examples illustrating how our new Standards for Safety, Health and Environment (which we refer to as SHE Standards) are being translated into practice throughout the Group. The standards form the basis of the Henkel Group's SHE Management System. The full text of the SHE Standards is published for the first time in this report.

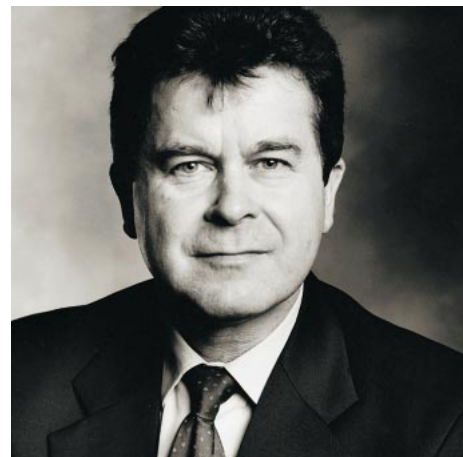
We are well aware that we will be judged by these standards, as will our corporate communications. Consequently, we have revised and expanded the design of the report. This is evident in the new "Dialogue" chapter, for example, where we express our views on subjects such as genetic engineering, which impinge on Henkel and are the focus of public controversy. We hope that an intensive exchange of ideas will produce more suggestions for ecologically better product concepts.

Our efforts to maintain a balance between economic and ecological considerations are described in the "Products" chapter. We report on the development of innovative products and systems, whose use will yield ecological benefits, and with which we hope to be able to establish ourselves in new and attractive markets. It has repeatedly been shown that good environmental compatibility must go hand in hand with superior product performance before customers will give preference to a new product.

We are convinced that, by integrating the SHE Management System into our business processes, we will be able to make our products and production methods environmentally more compatible, and by doing so will broaden the basis for the economic success of our company.



Dr. Hans-Dietrich Winkhaus



Dr. Wolfgang Gawrisch

A blue ink handwritten signature of Dr. Hans-Dietrich Winkhaus.

Dr. Hans-Dietrich Winkhaus
President and Chief Executive Officer

A blue ink handwritten signature of Dr. Wolfgang Gawrisch.

Dr. Wolfgang Gawrisch
Corporate Vice President Research/Technology

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Our cover

The consistent utilization of renewable raw materials is one of Henkel's corporate strategies. We have chosen crops that are processed as raw materials in the Henkel Group for our cover and as the visual openers for the chapters in this report.

Henkel is ready to meet the economic and ecological challenges of the 21st century. Through applied chemistry and expert service, the Company makes people's lives easier, safer and better.

The Henkel Group comprises more than 340 companies based in over 70 countries. In 1998, sales of the Henkel Group amounted to DM 21.3 billion (EUR 10.9 billion), of which 23 percent were attributable to our German subsidiaries and 77 percent to the non-German Group companies. The parent company is Henkel KGaA in Düsseldorf. Henkel is one of the German companies with the most business activities abroad.

Henkel has a total of 56,600 employees, 40,800 of them outside Germany. The Company has 15,800 employees in Germany, including 8,500 in Düsseldorf-Holthausen, the Group's biggest production site.

Six business sectors

Henkel is the world's largest processor of oils and fats derived from renewable raw materials. The Chemical Products business sector has production sites in all of the major economic regions. As an efficient, worldwide leading supplier of specialty chemicals, this business sector will, in the future, operate as a legally independent company under the name Cognis.

The Surface Technologies business sector is the international market and technology leader in products and systems for the surface treatment of metals and metal substitutes. In addition, it provides a comprehensive range of technical support services.

Henkel is also number one on the global adhesives market, with the most varied product portfolio, which includes craftsmen and consumer adhesives, industrial and packaging adhesives, reactive adhesives, and high-performance sealants.

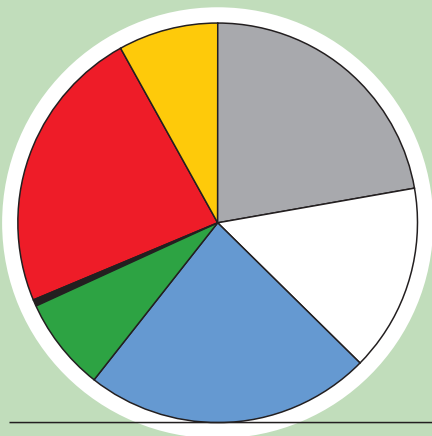
In the field of cosmetics and toiletries, Henkel is one of the top suppliers in Europe. It is also favorably positioned in growth markets elsewhere in the world. The core segments of the Cosmetics/Toiletries business sector are hair cosmetics, toiletries, and hair salon products.

Henkel's Detergents/Household Cleansers business sector occupies a leading position in Europe. It also utilizes opportunities of building up its position in the up-and-coming markets of the Mediterranean region and the promising future markets in China and India.

In the field of industrial and institutional hygiene, Henkel operates on the European market through Henkel-Ecolab, a joint venture established in cooperation with Ecolab Inc. of St. Paul, Minnesota (USA). This joint venture company is one of the most prominent suppliers in Europe. Together, Henkel-Ecolab and Ecolab Inc., in which Henkel has a 22-percent interest, are the international market leaders in industrial and institutional hygiene.

Sales by business sector, 1998

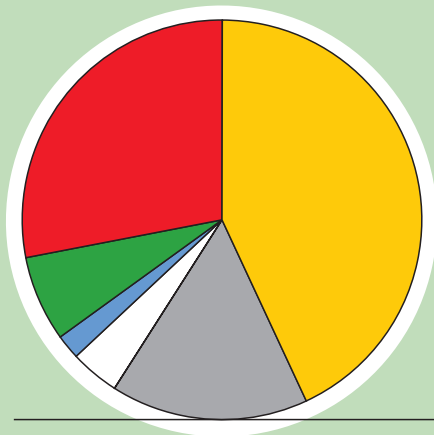
in DM millions (in EUR millions)



■ Chemical Products	4,881	(2,495)	23%
■ Surface Technologies	1,703	(871)	8%
■ Adhesives	4,639	(2,372)	22%
□ Cosmetics/Toiletries	3,335	(1,705)	15%
■ Detergents/ Household Cleansers	4,919	(2,515)	23%
■ Industrial and Institutional Hygiene	1,615	(826)	8%
■ Other	244	(125)	1%
Total sales	21,336	(10,909)	100%

Sales by region, 1998

by customer location
in DM millions (in EUR millions)



Germany	4,944	(2,528)	23%
Rest of Europe	9,831	(5,027)	46%
North America	3,383	(1,730)	16%
Latin America	1,059	(541)	5%
Africa	374	(191)	2%
Asia/Australia	1,745	(892)	8%
Total sales	21,336	(10,909)	100%

Product divisions

The Henkel Group manufactures almost 10,000 products. Worldwide responsibility for these products rests with six distinct business sectors.

Chemical Products

- **Oleochemicals:** fatty acids; glycerine and fatty acid derivatives; fatty alcohols and their derivatives; food and feedstuff additives; natural-source vitamin E and carotenoids.
- **Care Chemicals:** products for the cosmetics, toiletries and pharmaceutical industries, for detergents and household cleansers; aroma chemicals/perfume compositions.
- **Organic Specialty Chemicals:** base materials and additives for plastics, paints and coatings; auxiliary products for textile, leather and paper production; specialty products for mining, oil drilling and for lubricants, plant care formulations and the construction industry.
- **Inorganic products:** water glass.

Surface Technologies

Products and application systems for the chemical surface treatment of metals and metal substitutes; lubricants; cleaning products; corrosion inhibitors; products for conversion processing and for the treatment of cooling, process and wastewater; process control and metering equipment; antifreeze agents and corrosion inhibitors for motor vehicle cooling systems; CFC substitutes for cleaning applications. Specialty products for the automotive industry: polyurethane adhesives and elastomer sealants, epoxide structural adhesives, PVC and polyacrylate plastisols, dispersion adhesives, hotmelt adhesives and corrosion protection waxes.

Adhesives

- **Consumer and Craftsmen Adhesives:** wallpaper pastes; ceiling, wall covering and tile adhesives; home decoration products; sealants, polyurethane foam fillers; cyanoacrylates; contact adhesives; wood glues; PVC pipe adhesives; flooring adhesives; building chemicals; coatings; glue sticks; glue rollers; correction rollers; adhesive tapes.
- **Industrial and Packaging Adhesives:** packaging and labeling adhesives; shoe adhesives; cigarette adhesives; book-binding adhesives; adhesives for the wood processing industry; laminating adhesives; adhesives for nonwovens; leather board.
- **Engineering Adhesives:** reactive adhesives; high-performance sealants; sealing systems; assembly adhesives.

Cosmetics/Toiletries

Toilet soaps; bath and shower products; deodorants; skin creams; skincare products; dental care and oral hygiene products; hair shampoos and conditioners; hair colorants; hair styling and permanent wave products; perfumes and fragrances; hair salon products.

Detergents/Household Cleansers

Universal detergents; specialty detergents; fabric softeners; dishwashing products; household cleansers; scouring agents; floor and carpet care products; bath and toilet cleansers; glass cleaners and lens wipes; furniture and kitchen care products; shoe care and laundry conditioning products; plant care products.

Industrial and Institutional Hygiene

Products, appliances, equipment, systems and services for cleaning, laundry care, maintenance, sanitizing and disinfecting applications at major industrial and institutional customers, in the food and beverage industry and the agricultural sector.

Raw materials



Whenever possible, Henkel gives preference to the use of renewable raw materials. Agricultural land is needed to cultivate these materials. The Company also makes use of non-renewable fossil sources of raw materials. For some of its surface treatment products, Henkel still uses heavy-metal compounds. Chemical products and detergents and household cleansers require

relatively large inputs of raw materials, relative to the Group's total consumption. The production of the raw materials used by Henkel is not unusually energy-intensive or associated with critical emissions.



Disposal



Detergents and household cleansers, cosmetic and toiletry preparations, and industrial and institutional hygiene products all end up in wastewater after they have been used. Henkel has therefore formulated these products so that the aquatic environment suffers no harm as a consequence of their use. When industrial chemical products are used, the resulting

wastewater must sometimes be pretreated to remove harmful chemicals before it is discharged into the sewage system. Henkel's innovative forms of packaging have reduced the amount of packaging waste that consumers have to deal with. Industrial customers can also make use of returnable container systems.

Distribution



Henkel operates 210 production sites around the world. The products manufactured in a given region are mainly marketed within that region. Consequently, the manufacturer-to-client distribution routes are generally short. The Henkel Group produces oleochemical base materials at four sites in Germany, France, Malaysia, and the USA. The

Malaysian site processes vegetable oils obtained in Southeast Asia, while the other sites have to ship in the oils and fats needed as raw materials from the regions where they are produced.

Manufacture



Henkel produces oleochemical base substances by chemical reaction processes, sometimes at high temperatures and pressures. Its other manufacturing methods are mainly mixing processes. The production of detergents sometimes involves mechanical processes requiring sophisticated equipment. Some of the raw materials used to manufacture surface

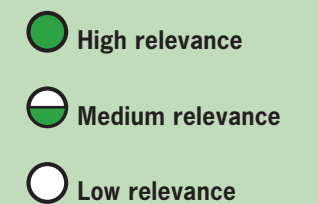
treatment products necessitate appropriate occupational safety measures.

Use



Large amounts of Henkel products end up in wastewater after use. Their component substances must not interfere with the proper functioning of sewage treatment plants or inflict damage on the life forms found in rivers and lakes. One of the guiding principles of product development at Henkel is therefore to ensure that customers can use the Company's products

in an environmentally compatible manner. The biodegradability of component substances is thus just as important a criterion as a potential toxic impact on the life forms existing in surface waters. Adhesives constitute an exception in that they generally remain on the articles they bond and are disposed of together with them.





Systematic approach



Integrated management system

Quality management systems that conform to the standards of the ISO 9000 series have been in place at Henkel Group sites all over the world and certified by accredited external verifiers for many years now. The concept of “Henkel Quality” goes much further than this, however. It covers safety, health and environmental protection and quality.

To give substance to this comprehensive quality concept, Henkel has defined 15 Corporate SHE standards concerning environmental and health protection and safety as a basis for its SHE Management System. These 15 standards are reinforced by a total of 55 SHE guidelines. The standards set the basic requirements. These include the development and implementation of programs to avoid or minimize any harmful effects of emissions on the environment. The guidelines then specify the framework. For example, an inventory of hazardous materials must be compiled, emissions must be measured, the results of the measurements must be documented in an emissions inventory, the emissions must be ecologically and toxicologically analyzed, and, if necessary, improvement programs must be drafted and applied. The standards and the guidelines are binding for the entire Henkel Group.

Continuous improvement

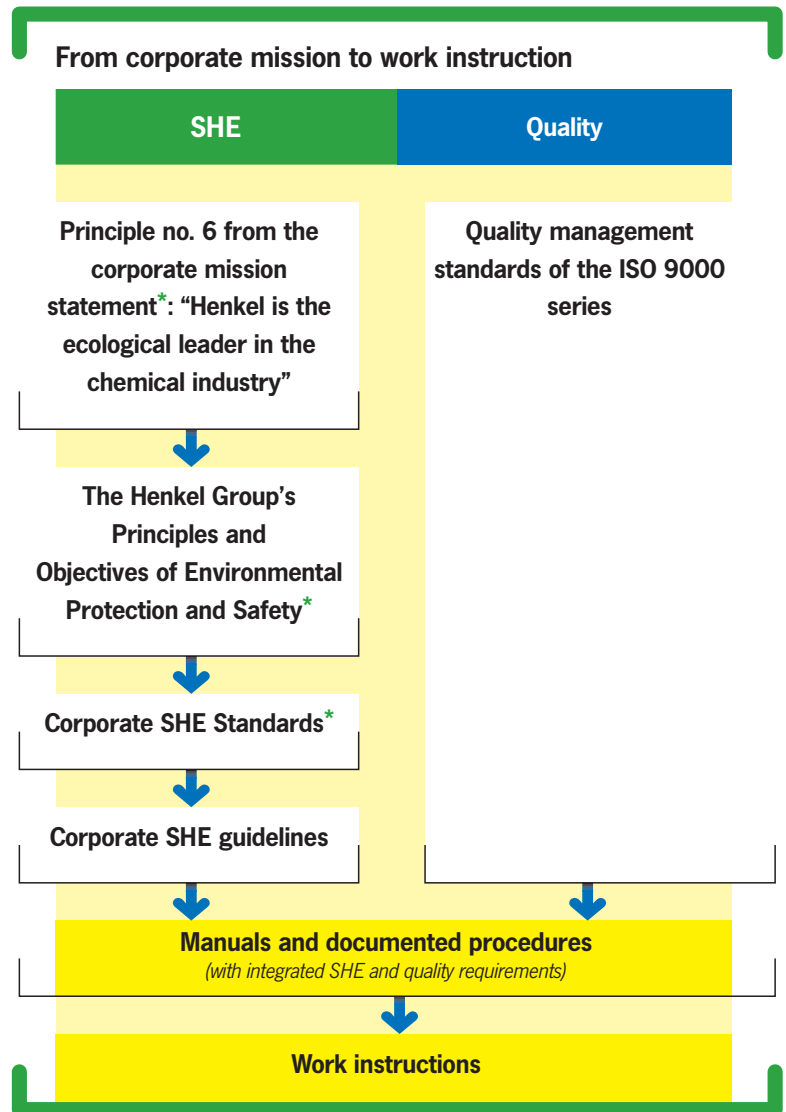
Quality management and SHE management systems have many elements in common, including employee training and the essential continuous improvement loop (define targets – implement action plans – monitor target achievement – define more challenging targets). Integration of the two systems is a logical step and delivers obvious benefits, such as a reduction in administrative work and costs. The integrated system is less complex, easier for employees to apply, and thus more readily internalized.

Site-specific procedures

The SHE officers at the Henkel sites integrate the requirements of the standards and guidelines into their documented procedures. In doing so, they take into account site-specific factors (such as the range of products manufactured there and the applicable national and local regulatory requirements) and assign responsibility to specific employees. The rules and procedures that have to be complied with at the sites (whether on the shop floor or in sales and administration) must, however, be formulated more precisely and geared specifically to the applicable work area. They are defined in

the work instructions. The SHE officers ensure that employees are properly trained and familiarized with the integrated system.

Many Henkel sites have completed these tasks, and in some cases have had their integrated management systems certified by accredited external verifiers in combined audits (for instance, ISO 9001 and ISO 14001). Implementation of the integrated management system throughout the Group will be completed in the year 2000.



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SHE organization in the Henkel Group

Henkel has revised the appropriate organizational structures and refocused its strengths to meet the requirements of the SHE Management System and to assure the success of its fusion with the quality management system to form an integrated management system. The SHE organization of the Henkel Group is outlined below.

Henkel Group Management Board

Henkel's Management Board bears ultimate responsibility for all SHE matters. It also defines corporate SHE policy. The heads of the six business sectors (Chemical Products, Surface Technologies, Adhesives, Cosmetics/Toiletries, Detergents/Household Cleansers, and Industrial and Institutional Hygiene) ensure that this policy is put into practice in the Henkel Group companies assigned to their respective sectors.

Henkel Group companies

Overall responsibility for any given company in the Henkel Group is borne by the respective business sector head on the Management Board.

Integrated management system

The integrated management system is an important instrument at the individual company level. It makes sure that there is a clearly defined chain of SHE responsibility and accountability, and that legal requirements, as well as Henkel standards going beyond legal requirements, are complied with. Nothing can be overlooked, as the system reveals any gaps. Documented procedures give plant managers, product developers, and distribution managers the reassurance that they are complying with all occupational safety requirements

in their plant, that they know and take into account the ecological and toxicological assessment of the planned ingredients when developing new products, or that they are placing an order with a shipping company that is known to be reliable.

SHE officers

Each business sector appoints its own SHE officers with corporate, regional or local responsibility. To guarantee that the integrated management system develops a high degree of functionality, this role is often entrusted to existing quality officers. The SHE officers inform and advise the organizational units assigned to them, and also have monitoring functions.

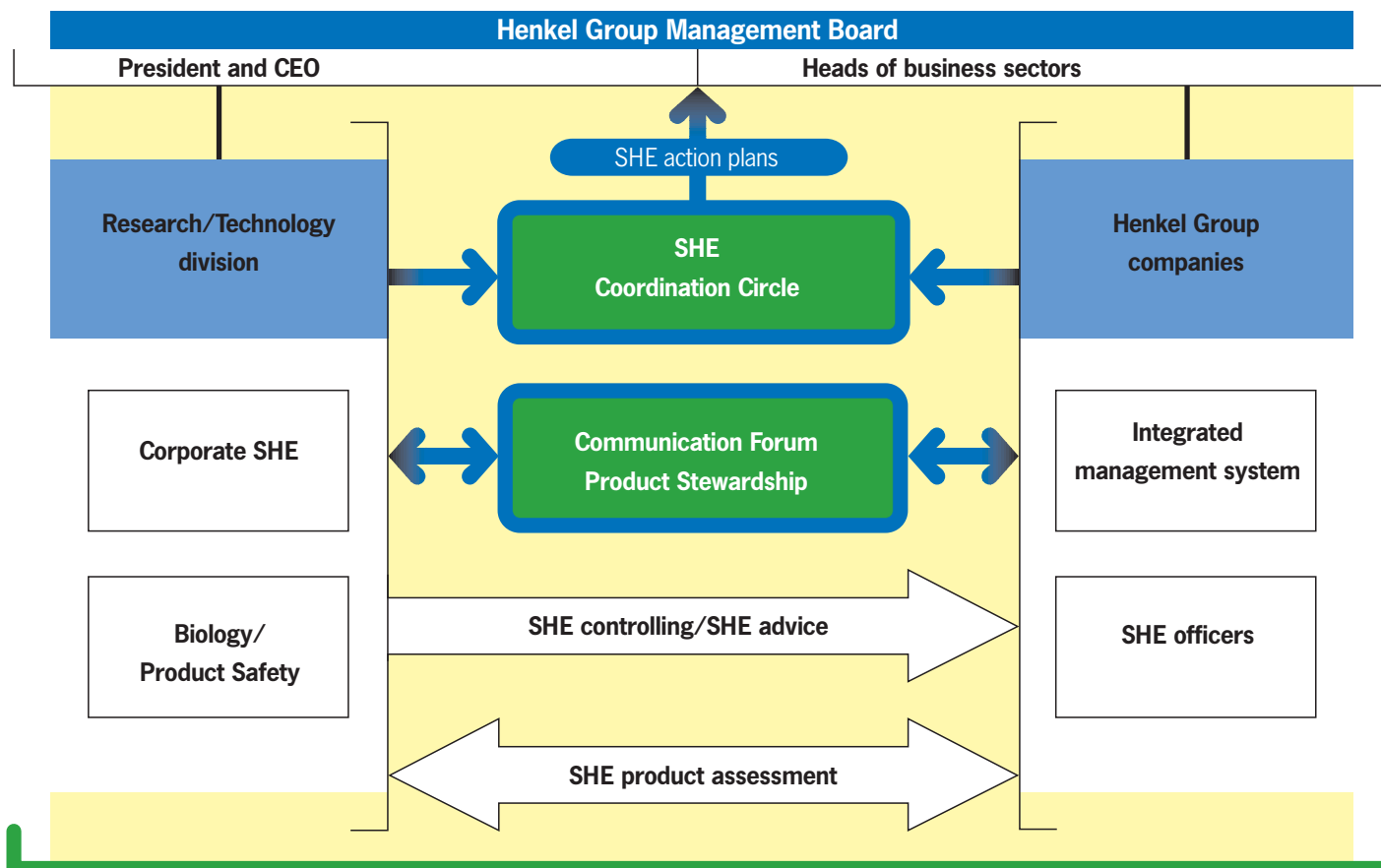
Research/Technology division Corporate SHE Biology/Product Safety

The central organizational units Corporate SHE and Biology/Product Safety belong to the Research/Technology division, which is headed by a Corporate Vice President who reports directly to the President and CEO. As competence and knowledge centers, these two organizational units advise and support the Henkel Group companies.

Specialists from Corporate SHE identify opportunities of improving environmental protection and safety at production sites worldwide, as part of their SHE controlling activities, for instance, and monitor the progress made.

The Biology/Product Safety unit, which incorporates the technical departments Toxicology and Ecology, advises and supports product developers and application engineers in the business sectors. It also carries out the final ecological and toxicological product assessments.

SHE organization



Communication Forum Product Stewardship

In the Product Stewardship communication forum, the product development and application technology managers of the business sectors and the experts of the central Biology/Product Safety unit regularly discuss and assess product safety topics.

New scientific findings or experience gained in the field are examined with regard to their relevance for Henkel products, as are amendments to relevant laws and ordinances. The focus is not just on SHE matters that directly affect Henkel products, but on the entire product life cycle.

Discussions in this forum thus prompted the decision to approve raw materials as detergent components only if they have been subjected to thorough ecological and toxicological testing and to document them in an international data processing system (see next page).

SHE Coordination Circle

The SHE Coordination Circle consists of representatives of all business sectors, the central SHE competence centers Biology/Product Safety and Corporate SHE, as well as Corporate Communications, and is chaired by the Corporate Vice President Research/Technology. It exercises coordinating, initiating and monitoring functions for the Henkel Group with regard to SHE matters. These include formulating SHE principles, objectives and concepts as action plans for approval by the Management Board, and monitoring the implementation of agreed measures.

The SHE Coordination Circle meets at least twice each year. It makes use of project groups and appoints their members. One of these international project groups produced the 15 SHE standards and 55 guidelines of the SHE Management System. Another has been entrusted with developing and implementing the SHE audit system.

The frequency, content and style of communications within the Henkel Group have evolved dramatically during recent years. Information, questions, experience, unusual occurrences, etc., were previously formulated in rigid report form and sent to colleagues in the Henkel Group according to a fixed distribution list. This time-consuming and sometimes restricting procedure has now disappeared, and employees simply write informal mail messages on their PCs. They might ask for details of a fire in a distillation plant in the USA because they operate a plant of this type themselves, or ask a Brazilian colleague whether they can also use the waste management software developed in that country. With a click of a button, they send their messages by Intranet directly to the recipients in the Henkel world.

This new communications technology promotes a direct international exchange of ideas and experience among Henkel employees who have to deal with the same or similar questions and problems. Henkel Group companies are growing closer. Transparency is increasing. Modern forms of communication also facilitate the worldwide implementation of the Henkel SHE standards. Five examples are related below.

Product safety

An international control system for formulations is currently being introduced in the Detergents/Household Cleansers business sector. The central element of this system is an internationally applicable list of raw materials that have been subjected to ecological and toxicological safety assessments and declared suitable for the formulation of products.

Moreover, all formulations used by Henkel to produce detergents and household cleansers in the various individual countries are recorded in a computer system. New or considerably modified formulations must be released by the SHE officers in Düsseldorf. This puts the finishing touches on the previously practiced system of regional approval procedures. Managers responsible for the formulation of detergents and household cleansers have welcomed the resulting transparency and high level of product safety.

Occupational safety

The Chemical Products business sector has established an international reporting and information system for occupational accidents that covers all of its production sites. For each lost-time injury that results in at least one day of absence, precisely defined information must be input into an accident database within 24 hours. The degree of detail required is the same worldwide. It includes a description of the cause of the accident, the conclusions drawn, and the measures to be taken to avoid future recurrence.

The database can be accessed by all production sites and by SHE officers at all levels up to and including the heads of the business sectors. The transparency of the accident situation strengthens the motivation of employees and managers at the individual production sites to improve occupational safety. In addition, the SHE officers in Düsseldorf analyze the accident scenarios. They formulate accident prevention proposals and measures and see to it that they are implemented Group-wide.

Occupational health and medicine

One of the Henkel standards and the associated guidelines contain goals relating to occupational health and medicine. The aim and task of occupational medicine at Henkel is to ensure adequate health protection for the company's employees and neighbors. Beyond this, the physicians support the business sectors with regard to all medical aspects of product safety and the protection of customer and consumer health.

The company medical service at Henkel in Düsseldorf has formulated a number of principles of occupational medicine, initially geared to conditions in Germany. These principles have proven their practical worth in the Henkel Group's German companies. Now the physicians have started to draft principles that will apply throughout the Henkel Group.

A checklist has been drawn up to simplify the translation of these principles into practice. All major occupational medicine topics are addressed in detail. These include medical equipment and treatment on site, assessment of individual workplaces from a health point of view, work organization and hazardous materials management, registration of the most common types of accidents, and illness frequency.



Plant fire departments and occupational physicians take part in regular emergency drills, like this one in Düsseldorf, to ensure that their skills are maintained at the requisite level.

The individual Group companies can use the checklist to document and improve their occupational medicine situation. Company physicians in Düsseldorf will also travel to other Henkel Group sites to advise those responsible for health there, starting with Chinese sites in mid 1999.

Henkel companies in other countries have taken up this idea and are setting up national residual materials exchanges with the help of the initiators in Düsseldorf.

Trade in residual substances

The idea of a residual substances exchange – at the industrial sector level, for example – is not new. What is unusual is that the staff of the Trade & Services department at the Düsseldorf-Holthausen site have actually set up such a facility. They did this because they were convinced that experts in the chemicals trade, who have to deal with product specifications every day, can also be successful residual materials brokers.

On the basis of their experience, the “brokers” are quickly able to find out which of the residual substances that are unavoidably generated by Henkel in Düsseldorf can be utilized by other Henkel Group companies or other firms as a valuable raw material. As a result, for example, 15 metric tons of a faulty product batch were spared from incineration. The rejected foam setting lotion was not suitable for cosmetic purposes, but another company was happy to buy it as a raw material, using it to make a defoamer for industrial applications.

The success of the Henkel residual materials exchange is not simply due to a combination of a good idea and expert knowledge. Committed and skilled marketing have made the exchange popular and have stimulated the creativity of many plant managers in finding uses for residual materials. The measure of their success is that more than 2,000 metric tons of Henkel residual substances could be additionally recycled last year, thus saving millions.

Hazardous goods management

The labeling, storage and transport of hazardous goods are subject to extensive and detailed regulations with which Henkel must comply. Moreover, to ensure ongoing compliance with the law, the relatively frequent amendments to these regulations must be translated promptly into practice. This often requires several thousand Henkel products to be checked at very short notice. Together with Sicad Environment, a Siemens subsidiary, Henkel’s Transport Safety department in Düsseldorf has therefore installed the Transec software system. As well as being faster and safer, the system has reduced the amount of work needed to check and recategorize hazardous goods.

The Henkel Group’s German companies that did not yet have a system of their own have started to work with Transec. Since the laws on dangerous substances are internationally harmonized, Henkel companies in a number of European countries are looking into the possibility of also using Transec.

The Henkel Group's Principles and Objectives of Environmental Protection and Safety contain an introductory sentence reading "Sustainable development must give equal priority to economic, ecological and social goals. Only economically successful companies will be able to contribute to effective environmental protection and social progress."

Uncertainty sometimes arises as to whether this statement applies in reverse. In other words, are companies that are committed to the principles of sustainable development economically more successful than others? And are they more attractive to investors because they can be expected to perform better and run fewer risks?

Yes, say the managers of environmental funds and investment companies, most of which have only been established recently, but are steadily growing in numbers and volume. They point out that their performance is usually better than the general stock indexes. They attribute this to the fact that they do not simply compile their portfolios in line with traditional concepts, but also by assessing and taking into account the sustainability of the companies they look at. They assume that an ecologically efficient company will be economically stronger, exhibit a more pronounced innovative drive, and have generally above-average management skills.

How others assess Henkel



The assets of the Sustainable Performance Group (SPG), an investment company which is quoted on the Swiss stock exchange, are managed by Sustainable

Asset Management (SAM). As SAM sees it, assessing a company purely on the basis of its ecological efficiency overemphasizes static environmental aspects. SAM therefore also considers long-term scenarios and qualitative assumptions about the development of new and sustainable technologies and products.

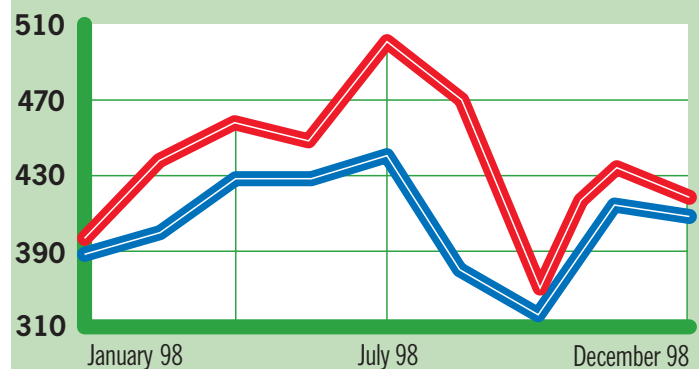
Henkel is represented in SPG's portfolio. In its quarterly client information bulletin, SPG published a report on Henkel, describing it as an example of a "sustainability leader." The SAM sustainability rating assesses Henkel as having "above average chances" and "below average risk."

Dialogue with eco funds

Henkel takes great interest in conducting a dialogue with the rating departments of investment companies and discovering the very different standpoints from which the individual funds carry out their assessments. The topics covered by this new type of dialogue complement the long-existing exchange of views between Henkel and ecological institutions, other stakeholders, and financial circles (analysts, investors, financial journalists). These discussions inject additional innovative ideas into the company.

In late 1998, the Swiss economics editor, Peter Rasonyi, researched the situation of eco funds in Switzerland. His report, which appeared in the *Neue Zürcher Zeitung* under the headline, "Die Umwelt-Anlagen kommen voran" (environmental investments make progress), stated that the assets managed by "green" funds had increased by around 50 percent in less than a year. Such assets represent only a very small fraction of the total assets managed in Switzerland, but the basic concept and its professional application had established themselves. In early 1999, the Öko-Invest publishing company, managed by Max Deml, disclosed the assets of green and ethical funds in its periodical. As listed in Öko-Invest, the assets of the 16 environmental and ethical funds in German-speaking countries amounted to almost DM 1 billion. By contrast, the assets of the 26 British funds amounted to DM 3.6 billion and the value of assets of the 33 funds in the USA was almost DM 30 billion.

Comparison of stock exchange prices in Swiss francs



— Sustainable Performance Group (SPG)
— Morgan Stanley World Stock Index

Source: SPG

Making risks calculable

Examples in this report demonstrate how the implementation of environmental protection measures can lead to savings (see page 11) and how sustainable development can yield competitive advantages in the market (see opposite page). Just the same, a company must also identify, assess and minimize the risks associated with its activities. If an operational incident should endanger the neighborhood or harm the environment, for example, the associated high and unanticipated costs are only part of the consequences. The company's reputation might be damaged, generally resulting in a drop in the price of its stock. In the case of the Henkel Group, which is dependent on the sale of branded products for half of its revenue, there is an additional factor: Every day, consumers are faced with the decision of whether or not to buy Henkel products, and Henkel's economic success is directly influenced by their choice.

Identifying, assessing and minimizing risks and eliminating unacceptable risks are therefore especially important

and constitute a top priority in the implementation of the SHE Management System in the Henkel Group.

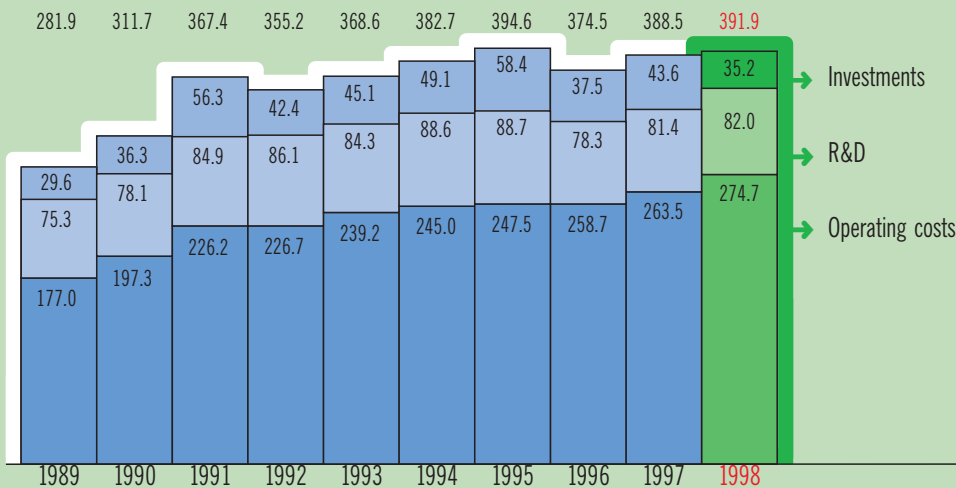
SHE audits at Henkel

Since 1996, 92 Henkel Group production sites around the world have been audited in the light of SHE considerations (55 of them in 1998). The audits are coordinated and supervised by SHE experts from Henkel, Düsseldorf, and in North America and parts of Latin America by the head office of its subsidiary, Henkel Corporation, in Gulph Mills, Pennsylvania. By the year 2000, 136 major Henkel production sites will have been audited.

The audits cover, in particular, safety analysis and risk assessment, occupational safety, employees' personal protective equipment, fire prevention, stockkeeping, and emergency

Expenditure on environmental and consumer protection within the Henkel Group

in DM millions



The above expenditure on environmental and consumer protection includes only the calculable costs. These comprise investments and operating costs for "end of pipe" technology to reduce emissions, as well as the costs of a number of special development projects for environmental and consumer protection.

Non-calculable expenditure is the additional cost of developing products and processes, and of constructing production lines that take environmental protection and safety aspects into account from the very beginning (integrated

environmental protection). As the emphasis steadily shifts toward integrated environmental protection, the calculable costs incurred for environmental and consumer protection lose their significance.

In the future, the level of these costs will gradually cease to be an indicator of what a company does to protect the environment. An overall view should also consider the competitive advantages gained by a company with a high environmental standard. In general, however, these are difficult to quantify.

plans. They also allow a practice-in-place assessment of the SHE Management System at the individual sites. The first audit at a site focuses especially on the safety of the production lines and storage facilities, as well as the protection of the health of employees and neighbors. Compliance with all other standards is then looked at in detail in the follow-up audits.

An audit takes several days and is carried out by independent Henkel Group experts from Düsseldorf or Gulph Mills in cooperation with the site's SHE officers. The team then discusses the results of the audit and develops proposals and plans of action for necessary and desirable improvements.

To protect sites against any loss of face, the audit team's results are not published within the Group. Only the responsible managers in the relevant business sector are informed. However, SHE controlling monitors whether the agreed improvements at the site are actually implemented.

This approach has proven successful in promoting an atmosphere of trust, thus encouraging site managers to cooperate fully with the auditors. A survey in 1998 showed that almost all sites regard the audits, the detailed assessment of the SHE situation, and the suggestions for improvement as important and helpful. In fact, the assistance of the audit teams has already enabled some sites to put long-planned projects into practice.



By the year 2000, SHE audits will have been carried out at 136 major production sites. The illustration shows such an audit being carried out in the Philippines. A checklist is being used to assess safety in a plant laboratory.

Sites certified to international standards		ISO 14001	EMAS
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Belgium	Henkel Belgium, Herent	X	
Brazil	Indústrias Químicas, Jacarei	X	
	Indústrias Químicas, Diadema	X	
Denmark	Henkel-Ecolab, Valby	X	
Germany	Grünau Illertissen, Illertissen	X	X
	Henkel Fragrance Center, Krefeld	X	X
	Henkel, Düsseldorf		X
	Henkel Genthin, Genthin	X	
	Henkel Oberflächentechnik, Herborn	X	X
	Henkel Teroson, Heidelberg	X	X
	Kepec Chemische Fabrik, Siegburg		X
	Neynaber Chemie, Loxstedt	X	X
	Thompson-Siegel, Düsseldorf	X	
Great Britain	Henkel Limited, Winsford	X	
Ireland	Henkel Ireland, Cork	X	
Netherlands	Henkel-Ecolab, Nieuwegein	X	
Norway	Henkel Nopco, Drammen	X	
Spain	Henkel Ibérica, Pulcra, Barcelona	X	
Sweden	Nordic AB, Mölndal	X	

Facility audits by independent auditors are an important instrument for ensuring compliance with SHE requirements, for verifying the functionality of the Henkel SHE Management System at the sites, and thus for reducing risks. SHE audits by independent Henkel experts are examples of such inspections.

If a site is successfully audited by external verifiers in line with internationally agreed standards, a certificate is awarded. Higher costs are incurred, however. If such certificates yield market benefits, the Henkel Group companies take advantage of this opportunity. Depending on the customer structure, they aim at achieving certification to the international environmental management standard ISO 14001 and/or the Eco-Management and Audit Scheme (EMAS) of the European Union. The table lists the Henkel Group's certified sites.

What audits achieve

Audits give a powerful stimulus to the implementation of necessary or desirable improvements. This is illustrated by an analysis of 44 audit reports by Henkel experts in Düsseldorf in the course of their SHE controlling activities. During the 44 audits, a total of 1,448 checklist items were examined, including safety precautions for the storage of hazardous materials, or escape routes in production, storage, and office buildings. In 617 cases, the situation was rated as good. In 831 cases, the audit result prompted site managers to plan improvement measures, such as the preparation of work instructions for store personnel, or better signposting of escape routes. In general, the improvements enhanced an already adequate safety level.

In three of the 1,448 individual checks, however, unacceptable risks were identified. At two sites, production lines had to be closed down and the risks eliminated immediately. One site manager was given a written warning, because regulations on the handling of dangerous substances were being ignored. In the third case, at a site that had recently been acquired, a number of serious risk areas were identified. A program of immediate action was agreed, and the risks have now been eliminated. The audit at this site will be repeated in 1999.

These results clearly illustrate that auditing of the SHE Management System at the sites is an important instrument for reducing risks.



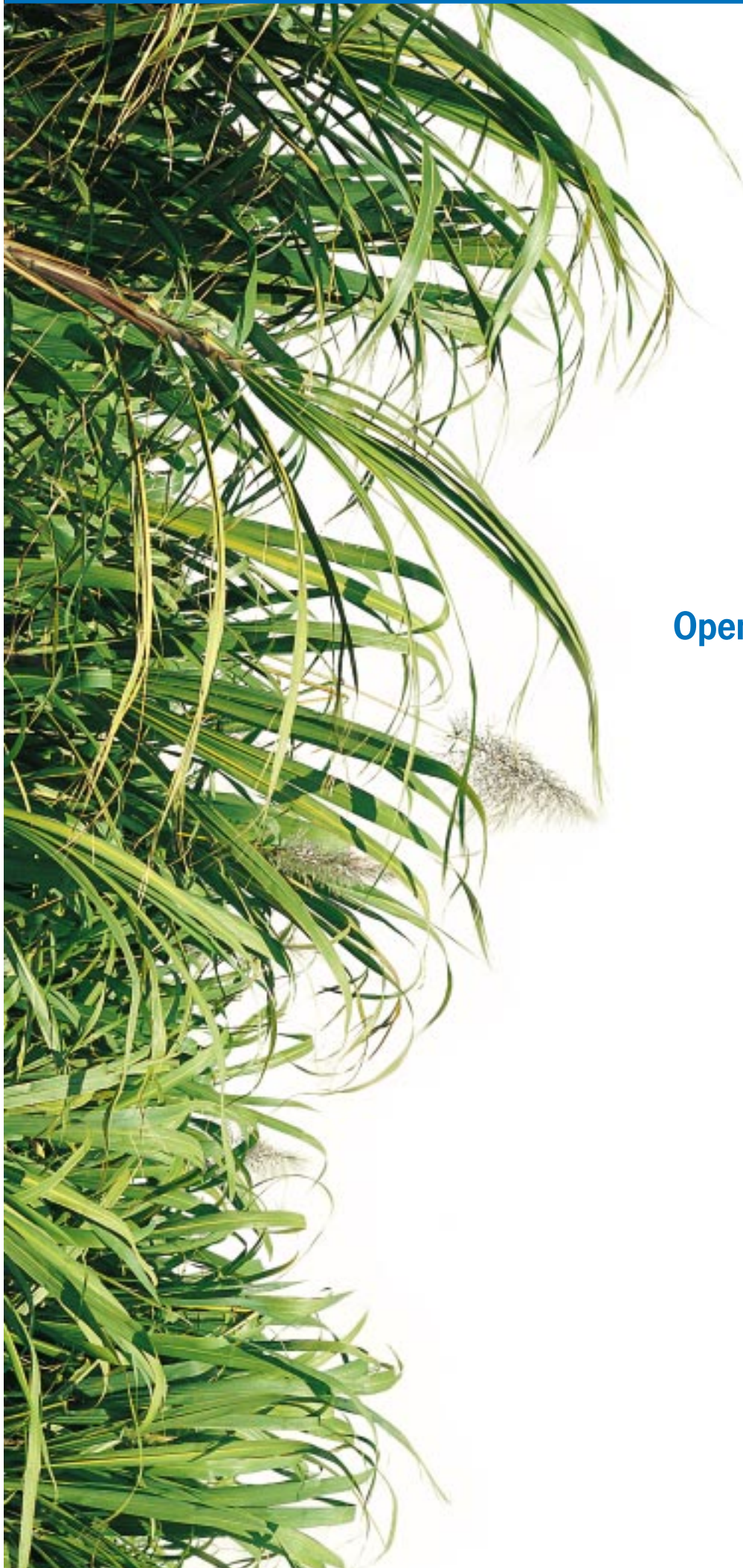
Independent auditors check the safety status and the efficiency of environmental protection at a wastewater pretreatment plant operated by Henkel Philippines.

Detecting historical contamination at new sites

New sites are regularly incorporated into the Henkel Group as a result of acquisitions. The Henkel SHE standards and the associated guidelines therefore include directions on how to proceed with regard to SHE considerations when a company is taken over. Examination of production sites for possible soil contamination is a key aspect of this.

The findings can have substantial financial consequences for Henkel. If the soil is so badly contaminated that it constitutes a threat to the environment, its remediation requires the deployment of considerable technical resources, at a correspondingly high cost. It is therefore no wonder that Henkel looks into every last detail during these examinations. The Chemical Products business sector has an experienced team of specialists which can also be called upon by other business sectors. Here are three examples of examinations carried out in 1998:

- The Italian production site of Caleppio di Settala near Milan came to Henkel as a consequence of the acquisition of the Novamax Group in 1996. It employs around 200 people and manufactures products for the surface treatment of metals. There was some suspicion that there was a legacy of contamination from the site's past activities. Soil and groundwater surveys were therefore carried out to clarify the situation and to ensure that no contamination from neighboring industrial sites was washed in with the groundwater. The final report, written in early 1998, gave Settala a clean bill of health. The site conforms to the legal requirements.
- A historical survey of the activities formerly carried out at a French site was sufficient to exclude the possibility of any risk.
- Contamination resulting from the careless handling of diesel oil in the past was identified and assessed at a site that Henkel planned to acquire in eastern Europe. The proposed remediation measures and costs were directly taken into account in the purchase negotiations.



Open dialogue



Social groups opposed to biotechnology and genetic engineering are taking an increasingly differentiated view of the individual application fields. In Germany, for example, the “green” political party “Bündnis 90/Die Grünen” signed a coalition agreement with the social democratic SPD in October 1998, containing the statement that modern methods of biotechnology and genetic engineering are firmly established in the fields of basic and applied research throughout the world. Moreover, both parties formulated one of their objectives in the following terms: “The new Federal government will continue to support the responsible innovative potential of biotechnology and genetic engineering.”

This was one reason for Henkel to turn the spotlight on the role of biotechnology and genetic engineering in its own activities and whether the research it carries out and the utilized applications can be categorized as responsible.

Biotechnologically manufactured detergent enzymes

A single, narrowly defined, but important group of raw materials is manufactured by Henkel by means of biotechnology and is, to some extent, genetically manipulated. These are enzymes for detergents and household cleansers.

Enzymes are of vital importance for metabolic processes in plants, animals and humans. They make certain chemical reactions proceed very quickly. Enzymes of the protease class, for example, break down the proteins in the food we eat into their basic building blocks, the amino acids. These in turn combine to create the body’s own specific proteins.

Enzymes are specialists whose capabilities are also used in washing and dishwashing machines. Proteases selectively break down protein stains, and lipases attack fat stains, even at low washing temperatures. This is why enzymes are important components of detergents.

During the life cycle of a detergent – from the raw material to disposal in a sewage treatment plant – most energy is consumed during the washing process itself (see the washing system life cycle assessment data on page 25). Furthermore, much more energy is consumed at high operating temperatures than at low ones. Enzymes take much of the credit for the excellent results obtained with modern detergents at low temperatures.

If certain bacteria, as naturally occurring microorganisms, are provided with the correct nutrients and kept under the conditions they prefer, they are capable of producing these detergent enzymes as metabolic products. Industrial-scale biotechnological processes have been developed to utilize this phenomenon. The bacteria grow and multiply in water-filled,

closed agitator vessels known as fermenters. The optimal conditions for growth are established by precisely regulating the temperature and the addition of oxygen and nutrients. This results in high enzyme yields. Finally, the enzymes are separated from the bacteria. To ensure that the enzymes can be readily and safely processed, auxiliary substances such as cellulose, starch and wax are used to produce stable enzyme granulates.



Henkel’s biotechnological and genetic engineering research and development are concentrated in Düsseldorf. The structure of a molecule of a detergent protease is shown here on a computer.

Genetic engineering at Henkel

In the past, Henkel used proteases that had been produced by the traditional method. The organisms needed to create the proteases were isolated from their natural environment and optimized by a process of selection. Since the mid 1980s, Henkel’s genetic engineering and biotechnology specialists have been working on transferring the genetic information of highly effective proteases to especially suitable, proven production strains. In this way, much purer enzymes can be obtained from smaller amounts of raw material. In addition, especially efficient enzymes can be developed by manipulating the genetic information.

Publicly accessible information on genetic engineering

The life cycle assessment of a genetically engineered protease in comparison with its predecessor shows that, even during production of the new protease, emissions of carbon dioxide and the organic load in wastewater decrease by more than 60 percent overall. Moreover, the cut in energy consumption achieved each year by switching production to the new type is equivalent to the energy needed for 11.5 million wash cycles at 60 degrees Celsius in modern household washing machines.

The president of the German Federal Environment Agency explained his view of biotechnology on the occasion of a seminar organized in Bonn by the Federal Ministry of the Environment in late 1996. He singled out detergent enzymes for special praise in view of the cuts achieved in energy and water consumption, as well as the reduced amounts of washing active substances released into the environment. He emphasized, "Considerable additional conservation of resources is achieved when the enzymes are no longer produced by traditional biotechnological, but rather by genetic engineering methods."

High safety standard

Henkel deals very carefully and seriously with all ethical questions relating to biotechnology and genetic engineering. Henkel's field of business is, however, far removed from those fields of genetic engineering that are on the fringe of the ethically responsible.

Henkel subscribes to the core ethical values of EuropaBio, the European Association for Bioindustries, and conforms to its principles (EuropaBio core ethical values can be found on the Internet: <http://www.europa-bio.be>). The principles, which cover issues relating to genetic engineering, include statements ranging from "We neither use nor support the use of cloning technologies to reproduce human beings" to "We support the exchange of biotechnology between developed and developing countries duly considering each country's cultural values."

The applicable regulation of the European Union defines four safety levels for handling genetically modified organisms. The microorganisms used to produce enzymes belong, without exception, to the level with the least safety requirements. Henkel's research laboratories and pilot plants are constructed and equipped to ensure that the microorganisms cannot enter the environment by way of the produced enzymes, wastewater, or any other path. After the enzymes have been separated, the biomass is sterilized. In other words, all of the microorganisms are killed.

Research and development in biotechnology and genetic engineering are concentrated at Henkel, Düsseldorf. The enzyme granulates for Henkel's detergents and household cleansers are produced in Kundl, Austria, by Biozym, a joint venture between Henkel and a respected Swiss company. Biozym does not carry out its own fermentation operations, but buys in enzyme preproducts. These are supplied by a neighboring partner company and other enzyme manufacturers.

The enzymes are clearly declared on the packages of Henkel detergents and household cleansers. In line with voluntary agreements, Henkel has provided the appropriate regulatory bodies with detailed and confidential information, including data on the production of its enzymes.

Henkel has always kept regulatory bodies, consumer organizations, environmental organizations and individuals informed about the importance of genetic engineering and biotechnology in the manufacture of enzymes through special brochures and other publications, as well as workshops. For example, a continuously updated brochure with the title "Henkel informiert – Enzyme und Waschmittel" (Henkel information – Enzymes and Detergents) is sent free of charge to consumers on request.

A brochure published jointly by the German, Austrian and Swiss industrial associations of detergent manufacturers ("Enzyme in Waschmitteln – die Rolle der Gentechnik") is addressed directly to consumers. Henkel helped to write it.

Henkel's strategy is not to exploit the opportunities offered by biotechnology and genetic engineering unless they result in ecological gain, greater benefit for consumers, and economic advantages for Henkel. Although it is highly unlikely that the Düsseldorf genetic engineering specialists could approach the boundaries of the ethically responsible when researching new fields of application, this would, nevertheless, be the first aspect to be thoroughly investigated before undertaking any possible future expansion of genetic engineering.

Facts and figures

All Henkel Group companies take extensive safety measures to avoid occupational accidents. They also rely on comprehensive training programs for the Group's 56,000 employees worldwide. Henkel regards occupational safety as an important managerial task, although each employee is, of course, responsible for safety at and around his or her own workplace.

Occupational accidents in the Henkel Group

The chart shows the number of accidents per 1,000 employees in the major companies of the Henkel Group. Occupational accidents are all accidents that involve Henkel employees on Henkel premises and result in at least one day of absence from work by these employees. Events outside of Henkel premises, such as traffic accidents on public roads, are not included. Henkel will be collecting such occupational accident data from a larger number of Group companies in the future.

In 1998, one Henkel employee fell to his death on the Jakarta site in Indonesia. This tragic accident resulted from failure to comply with regulations. As a result, employees attending safety courses are urgently reminded of the importance of being safety-conscious and are advised never to disregard safety instructions.

A total of 58 serious accidents were registered at 26 sites in 1998 (1997: 39). Henkel defines a serious accident as one in which the injured person is absent from work for more than 50 days. 27 of the 58 serious accidents occurred during typical production activities (for example, incurred while operating a machine, or scalds). The other 31 occurred as a result of a stumble, a twisted ankle, or a fall down a flight of stairs.

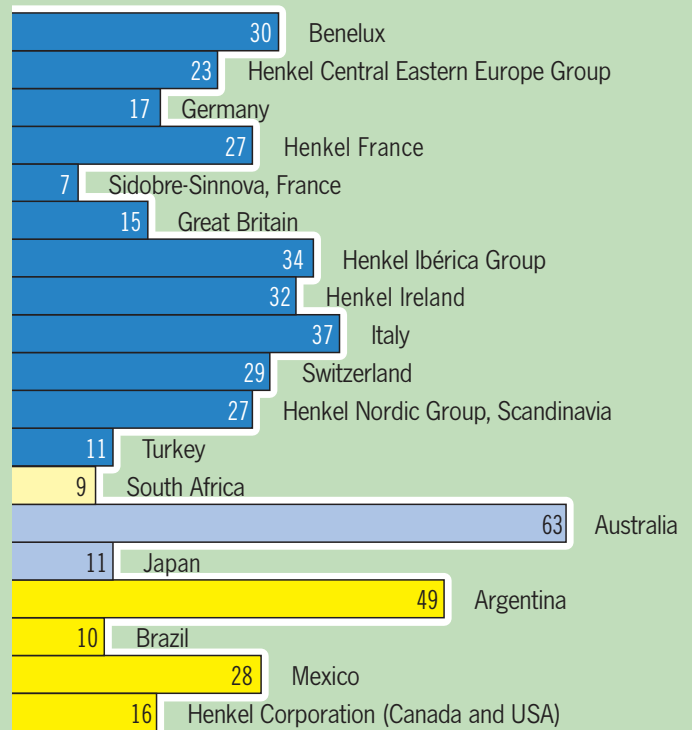
Complaints from neighbors

Although there were no cases of noncompliance with legal regulations, a total of 91 complaints concerning phenomena that were probably or certainly attributable to Henkel were received from neighbors of 23 of the 88 sites whose data were collected. Of these,

- 57 concerned odor,
- 18 concerned noise, and
- 16 concerned dust.

Occupational accidents in 1998

Number of occupational accidents with at least one day of absence per 1,000 employees (excluding off-site accidents)



Four sites received more than five complaints. In 63 cases, the source of the problem could be identified and measures to improve the situation were initiated. In 27 cases, the causes of the complaints have already been eliminated.

In 1998, for the first time, the 88 sites collected and documented the complaints from neighbors in line with the same defined criteria. Comparisons with 1997 are therefore of only limited validity. 61 complaints were registered in 1997.

Distribution safety

The safety aspects of transporting raw materials and products are the subject of a separate standard in the Henkel SHE Management System. Risks during transportation are systematically identified, and – when necessary – measures are taken to reduce them. The guidelines contain specifications that are directly related to transportation (for example, the legal requirements concerning the necessary shipping papers, safety data sheets, and emergency instructions), but also take environmental and safety aspects (for example, during loading or the cleansing of tank trucks) into account. The rules covering the careful selection of shipping agents are also important.

In 1998, there were no serious distribution incidents resulting in serious personal injury or environmental damage due to the accidental release of Henkel products.

A quantitative general overview of the state of distribution safety in the Henkel Group cannot yet be compiled, because the commercial and administrative documentation does not contain all of the necessary basic data. A concept for the Group-wide collection and documentation of the missing information is currently being drafted.

Employee training

Basic and advanced training, together with measures to raise employee awareness, are a key component of all plans for improving environmental protection and safety. The sites therefore organize regular employee training courses, whose format and content may differ widely, especially with regard to site-specific details. Although most sites document these training measures, the differences in the measures themselves prevent the data from being aggregated in a meaningful form. The SHE experts in Düsseldorf are therefore developing a concept for recording the different types of training courses, so that in the future it will be possible to obtain a clearer picture of training measures in the Henkel Group.

Significant operational incidents in the Henkel Group

In 1998, no significant operational incidents occurred. Henkel categorizes an incident as “significant” if its consequences include at least one of the following:

- fatalities or serious injuries,
- endangerment of the neighborhood or environment,
- tangible losses of more than US \$ 100,000,
- a high level of public reaction.

In 1997, four operational incidents were categorized as significant on the grounds of the associated tangible losses.

Scope of the reported SHE data

SHE data	Reporting base within the Henkel Group
Fatal occupational accidents Significant operational incidents Serious distribution incidents	All production sites (210)
Serious occupational accidents Complaints from neighbors	88 major production sites
Accidents resulting in at least 1 day of absence from work	Major Henkel Group companies (production and administration) with a total of some 34,000 employees (= 60 percent of the total workforce)

The SHE reporting system for the Henkel Group is currently being established. The table provides information on the scope of SHE data collection for the year 1998.

The social component of sustainable development

Sustainable development has an economic, an ecological, and a social component. For commercial and industrial companies, the task of maintaining an even balance between the economic and ecological aspects has been a permanent feature of their daily work for many years. In meeting this challenge, they are helped by their extensive experience and effective instruments, such as internationally agreed environmental management systems. As yet, however, there are scarcely any orientation guides with regard to how – and to what extent – social considerations should play a role in the activities of a company, and guidelines and fully developed management systems are almost non-existent. Companies must find their own way of deriving concrete objectives and action plans from the basic concept of sustainable development. One possibility is sponsorship.

currently formulating ethical standards to enable this objective to be anchored in corporate policy. The standards should be finalized and ready for Management Board approval by early 2000. They will then be published and will become mandatory for the entire Henkel Group.

Social standards

The Henkel SHE Management System focuses on the themes of safety, health and environmental protection. At the same time, Henkel acknowledges its social responsibility to its employees, neighbors, and customers, and to society as a whole. Henkel operates in accordance with these principles. An international workgroup of human resources managers is



Aid campaign in cooperation with UNICEF. Employees and pensioners donated winter clothing for Russian street children.

Examples of social sponsorship by Henkel

Country:	Henkel site:	Sponsored organization/cause:
Argentina	Avellaneda	Home for street children
China	All sites	Flood victims in China
Germany	Düsseldorf	UNICEF, community child and youth work
	Heidelberg	ZNS foundation (for accident victims with damage to the central nervous system)
	Loxstedt	Community youth work
India	Karaikal	Leprosy center
Ireland	Cork	Chernobyl Orphans Fund
Italy	Ferentino	Restoration of the antique theater
USA	Hoboken, New Jersey	Hurricane victims in Costa Rica

Henkel Group companies traditionally support social institutions, community help organizations, nursery schools, schools, senior citizens' homes, cultural activities, and scientific institutions. The Henkel Group donates several million DM annually in this way. The table shows examples of social sponsoring from the year 1998. They are representative of the activities of many other Henkel Group companies.



Model project for renaturing gravel pit lakes. Henkel sponsors research on underwater and floating leaf vegetation.

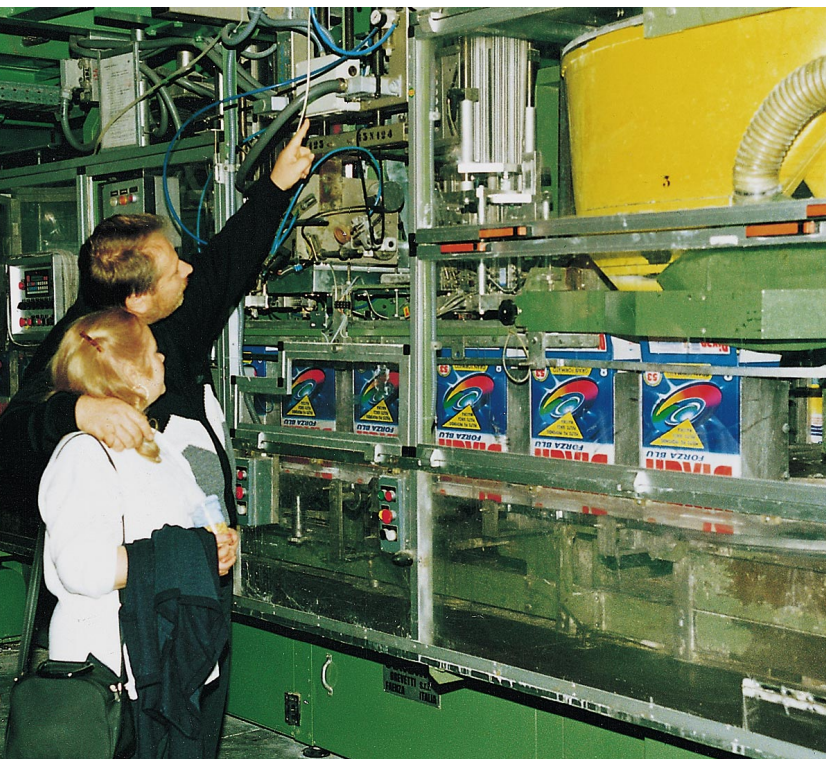
Eco sponsorship

In late 1997, Henkel KGaA in Düsseldorf established an annual eco sponsorship budget. This budget is used to support ecological projects that meet certain criteria. They might, for example, have a model character, or encourage changes in attitudes towards the environment. The table provides an overview of the measures that have so far been sponsored.

Outside of Germany, Henkel's Maribor site in Slovenia is sponsoring a project on protecting the olm, a salamander-like creature which has been declared part of the country's national heritage.

Henkel's eco sponsorship in Germany

Project:	Project partners:	Main sponsorship objective:
Eco audit at a secondary school	Fritz Henkel School, Düsseldorf-Garath	→ Promotion of environmental awareness and corresponding changes in behavior; model for other schools
Drafting of a habitat management plan for the Hofermühle Teich wetland nature reserve	Heiligenhauser Verein für wissenschaftliche Naturschutzpatenschaften, Heiligenhaus (society for scientific nature conservation sponsorships)	→ Support of a private initiative and unpaid work (retention of a habitat)
Drafting scientific concepts for protecting amphibians	Heiligenhauser Verein; with the support of the Löbbbecke Museum (Düsseldorf)	→ Model project for the development of practical solutions for protecting amphibians during the spawn run
Purchase of land to support an integral ecological concept	Biotopverbund Westliche Günst – Ottobeuren (habitat management institute)	→ Providing a cash injection to allow quick purchase of a piece of land (thus securing the future of extensive farming in the project area)
Creation of standing waters in a nature reserve	Biologische Station Urdenbacher Kämpe e.V., Monheim am Rhein (habitat management institute)	→ Support of the ecological development of the nature reserve in the vicinity of Henkel Düsseldorf
Study of underwater and floating leaf vegetation in various flooded gravel pits	Biologische Station Urdenbacher Kämpe e.V., Monheim am Rhein	→ Model project for renaturing other lakes created by the excavation of gravel
Near-natural restoration of a straightened stream course	Bergisch-Rheinischer Wasserverband, Haan (water management board)	→ Ecological development of land in the vicinity of Henkel in Düsseldorf



Ferentino celebrates: On the occasion of its 25th anniversary, the detergent site in the Italian town of Ferentino invited employees' families and the neighbors to an open house event.

Community outreach

Dialogue with our neighbors and the public at large, learning about their concerns and reservations, informing them about the site's activities and explaining how the Company operates, getting to know each other - all of these are important aspects in favor of an open house. They justify the time and effort involved.

In 1998, ten Henkel sites held an open house day

Brazil:	Jacarei
Germany:	Genthin Heidelberg Loxstedt
Italy:	Fino Mornasco Ferentino
Mexico:	Ecátepec de Morelos
Russia:	Tosno
USA:	Hoboken, New Jersey Kankakee, Illinois

Prizes and awards in 1998

Country:	Company:	Prize:
Germany	Kepec, Siegburg	Rhein-Sieg County's Environmental Technology Prize; the city of Siegburg's Environment Prize for Innovation
Ireland	Henkel Ireland, Cork	National Award for Waste Recovery
USA	Chemicals Group of Henkel Corporation	Award under the Advanced Technology Program of the National Institute of Standards and Technology for the development of environmentally compatible chemical intermediates, together with General Electric Corporation
	Henkel Surface Technologies, Madison Heights, Michigan	Whirlpool Corporation's Environmental Partnership Award
	Henkel Corporation	Certificates awarded by the U.S. Chemical Manufacturers Association to 17 sites for their outstanding safety performance in 1998



Henkel Surface Technologies provided support and advice to its customer, the renowned manufacturer of household appliances, Whirlpool Corporation, in improving waste management at a production site. As a result, an annual reduction of around 13,000 cubic meters of wastewater and 50 tons of waste was achieved, saving Whirlpool a five-figure sum. The Environmental Partnership Award presented to Henkel Surface Technologies was paired with a considerable cash prize. Henkel has donated this to the Cumberland River Compact, a non-profit group that is carrying out a project for ecological improvement of the Cumberland River and its tributaries. The Compact is made up of businesses, individuals, community organizations and agencies working in the Cumberland River watershed.



Safe products



Product stewardship is a key element of Henkel's SHE standards in relation to products. Henkel continuously improves the safety and environmental compatibility of its products in all phases of their life cycle, including planning, development, production, transport, use and disposal.

Comprehensive and regular risk assessment is an integral part of the product stewardship concept.

The following chapter explains the implementation of product stewardship by describing concrete examples. Some of these examples are also used to illustrate the environmental impacts shown in the overview on pages 4 and 5 in more detail for individual product divisions.

Unconsidered activities are futile

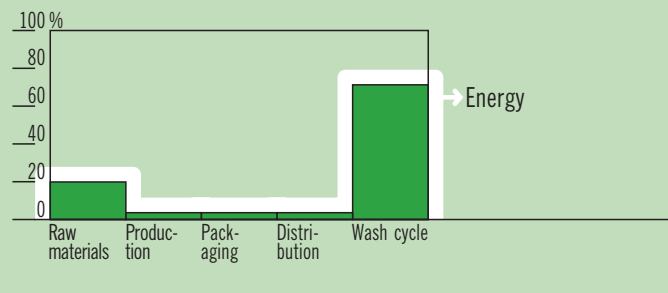
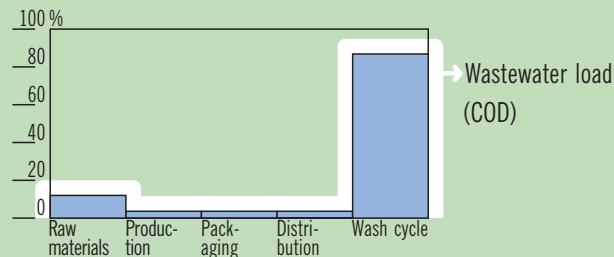
Effective environmental protection requires a systematic approach. For any given product, this means that measures to improve its environmental compatibility must focus primarily on those phases of its life cycle where its environmental impact is greatest. Analysis and assessment of product life cycles – from the cradle to the grave – must therefore be the starting point of any strategy aimed at improving environmental compatibility.

Some of the results can be expressed in figures. The life cycle assessment of the “washing” system shown here is a case in point. The diagram is a selective and simplified representation of the results of this assessment. The two key parameters “energy” and “wastewater load” have been singled out, and their life cycle totals have been broken down to show the percentages attributable to various life cycle phases.

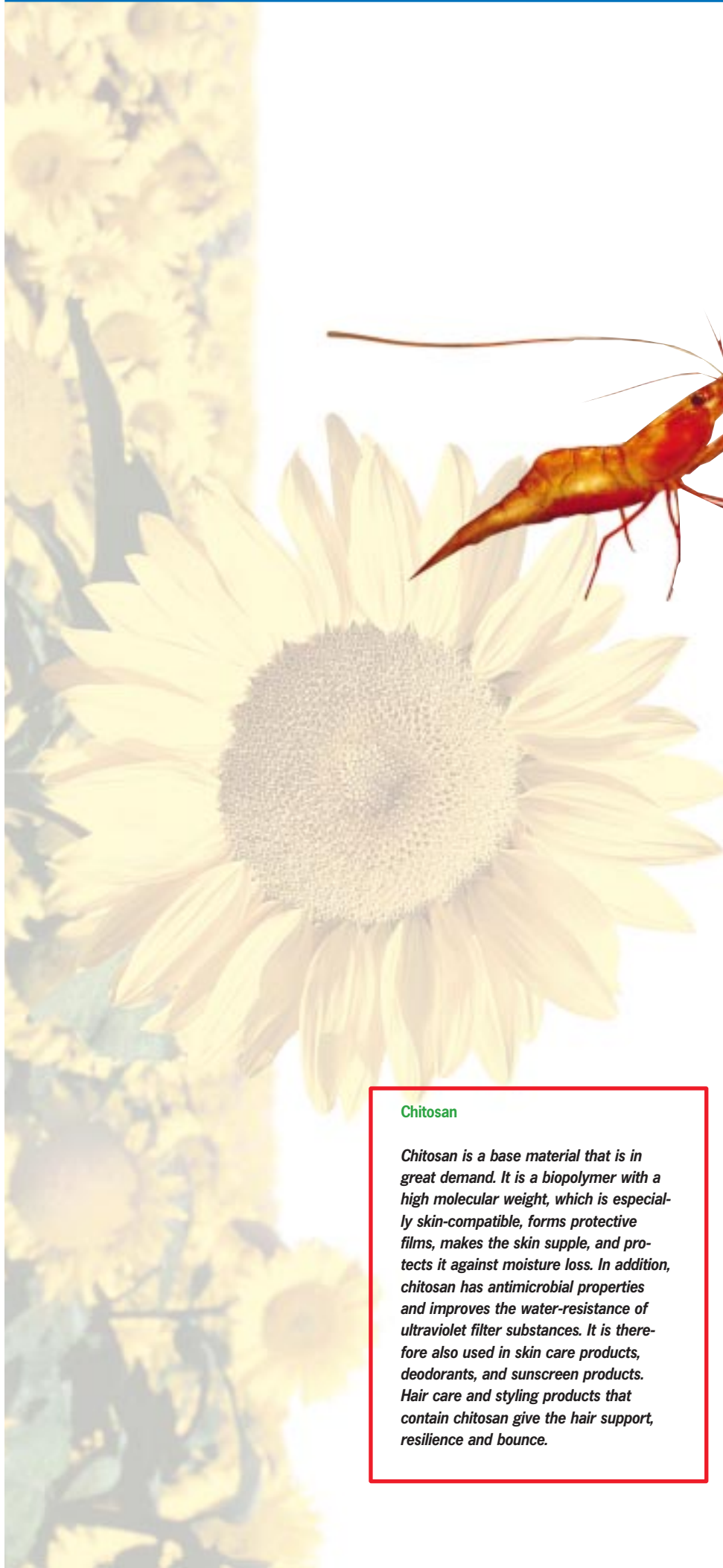
This focus on the main impacts of the washing system does not mean that the other life cycle phases are ignored. The “from road to rail” distribution concept for detergents and household cleansers (see Environment Report 1994) and the continuous reduction in the volume of packaging materials (one example of which is given on page 41) are clear evidence to the contrary.

Life cycle data of the “washing” system

Energy consumption and wastewater load (chemical oxygen demand)
Percentages
Detergent: Persil Megaperls



The wash cycle has by far the greatest impact. The Detergents/Household Cleansers business sector has, therefore, reduced the energy consumption and amount of chemicals per wash cycle by introducing improved and new detergent formulations. On page 35, you can find a report on detergent tabs, the latest example of this consistently implemented development.



Raw materials from shrimp shells

Chitosan production started

In early 1998, it was still a development objective and yet, only eleven months later, production of cosmetic quality chitosan was started in a newly built factory in the Norwegian town of Tromsø. The production lines were set up in record time with a method developed by Henkel, and the whole operation is a joint venture between Henkel and two leading shrimp suppliers. The raw material for the production process is shrimp shells, which explains why the site was built in the immediate vicinity of the processing plants for freshly landed shrimps and prawns.

The shells of these marine creatures used to be regarded as a low-value waste product and were ground up into meal, which was added to fish food. Now the joint venture extracts a valuable base material for high-quality cosmetic products for skin and hair care. This is a good and topical example of the implementation of Henkel's strategy of utilizing renewable raw materials. Indeed, it is an especially good example because chitosan is produced from "waste" materials and is thus not dependent on its own raw material resources.

The concept of using a waste material to produce a high-quality raw material that is in great demand is also compatible with the Norwegian government's program for encouraging new technologies. Official approval was granted extremely quickly. In view of the jobs created, the project also received strong support from the local community. Henkel will follow up its lightning start by improving the new method still further – for example, by recovering protein raw materials from the process water.

Chitosan

Chitosan is a base material that is in great demand. It is a biopolymer with a high molecular weight, which is especially skin-compatible, forms protective films, makes the skin supple, and protects it against moisture loss. In addition, chitosan has antimicrobial properties and improves the water-resistance of ultraviolet filter substances. It is therefore also used in skin care products, deodorants, and sunscreen products. Hair care and styling products that contain chitosan give the hair support, resilience and bounce.

Reinforcing plastics with natural fibers

Many molded parts, even ships' hulls, are made from glass fiber reinforced plastic (GRP). However, this material is not suitable for every field of application. Natural fiber reinforced plastic is superior in a variety of ways, especially when the plastic that binds the fibers – the matrix resin – mainly consists of renewable raw materials. One of the objectives of the Chemical Products business sector and Henkel's central research department is to develop such matrix resins and test them in the field. The target is a material that is 80 percent based on native raw materials.

The Henkel project has attracted official interest. As it promises to help open up new markets for German agriculture, *Nachwachsende Rohstoffe e.V.*^{*}, a specialist agency of the German Ministry of Food, Agriculture and Forestry, is providing financial support.

Other partners are involved in the pilot project. While Henkel is developing these "tailor-made" matrix resins, the *Deutsches Zentrum für Luft- und Raumfahrt e.V.*^{**} is contributing its extensive know-how in the production of molded parts from composite materials. One of Germany's leading office furniture manufacturers, Wilkhahn, an ecologically oriented company, is the third member of the pioneering project. Wilkhahn is gaining experience with the new material in the field and has started to use natural fiber reinforced plastic as a strengthening element in its seating products.

The project is at the beginning of its development.^{***} Henkel is trying to attract other users from different sectors to become partners.

^{*} *Nachwachsende Rohstoffe = renewable raw materials*

^{**} *German Aerospace Center*

^{***} *Further information in the new research magazine from Henkel, which can be requested free of charge*

Ecologically improved industrial products

The product developers of the Chemical Products business sector have successfully launched a new generation of surfactant formulations onto the market for the plastics manufacturing, papermaking, paints and coatings, and construction industries. These innovative products are characterized by more than their improved performance. They are also formulated without the ecologically contentious alkylphenol ethoxylates (APEO). With this new series of products, Henkel is helping its customers to achieve their voluntary ecological improvement targets.

The ecologically optimized new surfactant formulations can be utilized in a wide range of possible applications. They can, for example, be used in the production of emulsion paints and dispersion adhesives, and as dispersants for pigments in environmentally compatible water-based industrial coatings. The paper industry uses them as antifoaming agents based on natural fatty alcohols. In addition, the biodegradable emulsified vegetable oil derivatives are replacing the previously essential mineral oil emulsions in release agents for shuttering panels in the building industry and – the latest development – in plant protection products.

The new products are already making inroads into this diverse market, which accounts for around ten percent of surfactant consumption worldwide.

This innovation won the development team the 1998 Fritz Henkel Award for Innovation.

Ecological information

Natural fiber reinforced plastic moldings, whose matrix resin was developed and improved using mainly renewable raw materials, have a range of ecological advantages. The use of renewable raw materials helps to conserve finite raw material resources. Plastics reinforced with natural fibers are also much lighter than the glass fiber reinforced varieties. When used in the interiors of road vehicles and aircraft they save weight and therefore fuel. In contrast to

glass fiber reinforced moldings, those reinforced with natural fibers leave virtually no residues when they burn. At the end of the product's life cycle, therefore, they can be incinerated as a source of useful thermal energy. Most of the carbon dioxide released during incineration originated in renewable raw materials and does not, therefore, change the world's carbon dioxide balance.

Chrome-free processes



Chrome-free conversion processes for aluminum have not yet achieved the anticipated market success. The expected breakthrough in the architectural aluminum market (aluminum cladding for the outside walls of buildings) has not yet materialized. By contrast, the chrome-free process has benefited a major manufacturer of aluminum wheel rims, as well as a number of companies that serve smaller markets. They make products such as profile sections for shower cubicles or aluminum parts for automobiles or household appliances. The aluminum body shell of the new Audi automobile model, which will start to come off the production lines in late 1999, will also receive a chrome-free pretreatment. This could point the way for others, thus helping Henkel Surface Technologies to make further inroads into the market.

Made-to-measure plastics

The Surface Technologies business sector regards itself as a supplier not only of products, but also of innovative manufacturing processes that benefit both its clients and the environment. For example, the thickness of car body panels can be reduced by filling the cavities with reinforcing plastics. The necessary made-to-measure products are called engineered polymers and are supplied by Henkel Surface Technologies. The advantages for the environment include even lighter vehicles, less consumption of fuel and other resources, and fewer traffic-related emissions.

An essential precondition for the implementation of such new ideas is not just close cooperation with clients, but also involvement as early as the design phase of an automobile. The objective is to actively stimulate this process and to realize the innovative engineered polymers concept.

Nickel-free corrosion protection for automobiles

One example of successful cooperation with clients is the joint development of an alternative corrosion protection process for the new Mercedes A class. Daimler-Chrysler and Henkel Surface Technologies joined forces to introduce this process, which makes no use of the toxic heavy metal, nickel, in the production line at the Rastatt factory in Germany.

A team of specialists from Mercedes and Henkel started work in late 1996 and quickly pushed the development forward to completion. Since mid 1998, around 800 A class cars have been leaving the assembly line each day, complete with a nickel-free phosphate coating. As result, an annual saving of around one metric ton of nickel is achieved. In comparison to the total European consumption of approximately 100 metric tons of nickel for the phosphating of automobiles, this is just a small first step. Nevertheless, it is a start. Henkel Surface Technologies is convinced that more automotive factories will switch to nickel-free systems in the future.

Market success for environmentally more compatible stainless steel pickling agents

Traditional stainless steel pickling agents contain nitric acid. As a consequence of this, harmful gases are formed during the pickling process and the wastewater contains nitrates. The Surface Technologies business sector therefore decided to set itself the goal of developing and marketing stainless steel pickling agents that are free of nitric acid.

Henkel applications specialists in Italy developed an alternative product. This nitric-acid-free pickling agent has already acquired a 65-percent market share in Italy and a 10-percent share worldwide. Seen from another angle, in 1998 around one million metric tons of stainless steel sheet, plate and wire were treated using the Henkel nitric-acid-free method.



Nickel-free phosphating. This alternative corrosion protection process was developed by Daimler-Chrysler and Henkel Surface Technologies for the production of Mercedes A class cars.

Ecological information

Products for the chemical treatment of metal surfaces must alter the surface metal by entering into selective chemical reactions. Only substances with a high chemical reactivity can be used for this purpose. They are categorized as dangerous substances. Some of the products also contain heavy metals, such as chrome or nickel.

Henkel Surface Technologies maintains a lively dialogue with its clients. Users are given extensive advice to enable them to take all necessary occupational safety measures when working with dangerous substances.

The wastewater from production lines where chemical

surface treatment is carried out must, in general, be subjected to special purification procedures before it can be channeled into a biological sewage treatment plant. Heavy metals, in particular, are removed during the preliminary purification stage. One of the main objectives of Henkel Surface Technologies is to provide improved products that minimize the risks both during and after use. This is why alternative products, which are free from hazardous and environmentally polluting substances such as chrome and nickel, are developed and marketed.



Reduced emissions

In 1998, Henkel achieved its objective of supplying extremely low-emission flooring adhesives for all work processes involved in laying floor coverings. New additions to the range of extremely low-emission floor covering adhesives from Thomsit include primers, leveling compounds, and further adhesives. These products conform to the requirements of the Gemeinschaft Emissionskontrollierte Verlegewerkstoffe e.V. (quality association for emission-controlled flooring adhesives). They are labeled EMICODE EC1. Such Henkel products are already available in Germany, Austria, Switzerland, and the Benelux countries.

Some 70 percent of all Thomsit carpet adhesives have already been modified to comply with the requirements of the EMICODE EC1 quality mark. At least one extremely low-emission system (primer, leveling compound, adhesive) is available to health-conscious and environmentally responsible processors for most flooring tasks. The product developers want to modify the majority of the flooring adhesives to qualify for the extremely low-emission categorization within the next two years.

Around half of the 400 million square meters of floor coverings and parquet that are laid in Germany alone are secured by adhesives. Henkel, the market leader, supplies about one third of these. The new flooring adhesive systems ensure clearer air and a feeling of well-being in many thousands of rooms.

Renovation of the Berlin Reichstag. The environmentally compatible products for laying the floor coverings were supplied by Henkel Bautechnik.



Even the slightest risks are avoided

Since 1998, product developers and marketing specialists of the Adhesives business sector have been working to replace alkylphenol ethoxylates (APEO), a class of nonionic surfactants, in aqueous dispersion adhesives. These include adhesives for wall and floor coverings and labels. APEO is no longer in favor because it is only slowly biodegradable and because the breakdown products, which are transported in wastewater into sewage treatment plants, from which they are discharged into surface waters, are suspected of causing endocrine effects. They can influence the hormonal balance in the human body and in animals. In particular, interactions with the male and female sex hormones have been the subject of debate. In the coming years, international scientists must clarify whether this suspicion is justified.

Henkel, however, is not prepared to take the slightest risk. Although APEO from dispersion adhesives can only be transferred to wastewater in small amounts when the product containers are rinsed and cleaned, the entire product range is to be modified as a precaution. In Germany, around 70 percent of Henkel's technical consumer products are already APEO-free. In other countries, new formulations must first be developed due to differences in the availability of raw materials.

Good things come in small packages

If a room is to be provided with a door, a door frame has to be put in place first. The joint to the wall is filled with an expansion adhesive, and the frame is thus fixed at a number of points. This used to be the undisputed domain of two-component foams, supplied in aerosol cans. Now, however, they are facing serious competition. The specialists of the Adhesives business sector have developed a product that needs no propellant gas and can still be applied cleanly, quickly, and without the assembly strips that are usually needed when propellant-free products are used. The foam does not drip, and it hardens in just a few minutes – good reasons for craftsmen to turn to this innovative product. The unexpectedly high level of demand for the new expansion adhesive confirms this.

And how does the environment benefit? Firstly, the new cartridges are designed to hold just enough to install one door. This eliminates the problem of what to do with product residues. Moreover, the aerosol foams – which Henkel will initially continue to supply in response to consumer demand – contain a fluorinated hydrocarbon that contributes to the greenhouse effect.

In 1998, the year of the market launch, craftsmen in Germany used enough propellant-free product to bring about an improvement in the greenhouse effect equivalent to around 2,500 metric tons of carbon dioxide. Small – and smart!

Although aerosol foams still predominate, Henkel is backing the propellant-free alternative. Each year 20 million inside doors are fitted in Germany alone. The new Henkel product should conquer an even larger share of this market.

Ecological information

The main environmental impact of adhesives is due to the solvents that are released when the adhesives are used. The cured adhesive itself follows the life cycle of the product to which it is applied and is disposed with it. The Adhesives business sector therefore decided to develop low-emission adhesives. The flooring adhesives and propellant-free assembly foams are examples of these.

In Great Britain, Henkel is the leading supplier of paint strippers. They contain methylene chloride, which is a chlorinated hydrocarbon. The major part of the 3,447 metric tons of chlorinated hydrocarbons processed in the

entire Henkel Group is used in Great Britain for the manufacture of these products.

For a number of years, Henkel has been trying to establish an alternative, chlorinated-hydrocarbon-free paint stripper on the British market. Despite all of the company's considerable efforts, this product's market share remains at around three percent. One reason for this is that craftsmen have to accept that the product acts more slowly and adjust their work schedules accordingly. Another reason is that the toxic potential of methylene chloride is rated less critically in Great Britain than in other European countries.



Specially for gray hair

After almost ten years of research and development, in mid 1998, Schwarzkopf & Henkel launched Poly Re-Nature, a “natural color” cream for graying hair. The product has a novel action principle, which returns graying hair to its previous natural color. The cream contains a precursor of the pigment that gives hair its natural color (melanin). With the help of the oxygen that is present in the air, it is capable of forming color pigments that resemble natural ones. The “mild” oxidation process distinguishes the new action principle from that of traditional hair colorants and is especially gentle on the hair.

There are other differences. Poly Re-Nature has to be applied several times over a period of a few weeks in accordance with the manufacturer’s instructions before the user’s original natural hair color reappears. Customers can decide how long the product should be allowed to take effect, how often it should be applied, and whether the gray color should be completely or only partially banished from their hair. After this, only root treatment is necessary.

The product launch in Germany, Austria and Switzerland evoked a sensational response. The media reported on it extensively, and Schwarzkopf & Henkel had to increase the capacity and service hours of its hotline several times to cope with the many customer questions about Poly Re-Nature.

After only a few months, 500,000 consumers had used the product successfully. Reactions to Poly Re-Nature were overwhelmingly positive. The innovative product has been available in Belgium and the Netherlands since March 1999, and other European countries will follow.

Poly Re-Nature in the headlines

The market launch of Poly Re-Nature was accompanied by lively media interest. Some weeks afterwards, the product hit the headlines again. This time the media reported stories of individual customers who complained about the discoloration of their blond hair. What had happened?

Due to the large numbers of callers during the product's introduction phase, Schwarzkopf & Henkel could not guarantee its one-hundred percent accessibility by telephone at all times. A few customers, who had applied Poly Re-Nature to light blond or blond hair and were dissatisfied with the result, contacted a consumer organization in North Rhine-Westphalia. The organization then informed the media. Schwarzkopf & Henkel reacted immediately. Henceforth the warning "not suitable for light blond or blond hair" was printed on all packages displayed for sale.

Schwarzkopf & Henkel systematically analyzed all complaints. Intensive contact with customers via the consumer hotline proved invaluable. Customers were also offered the opportunity to consult hairdressers in their home towns. The Schwarzkopf & Henkel hair experts helped to eliminate as quickly as possible any undesirable effects of using Poly Re-Nature. Some customers also accepted an invitation to visit the Schwarzkopf & Henkel test salon in Düsseldorf for advice.

Ecological information

When they develop and market their products, the experts of the Cosmetics/Toiletries business sector look beyond the effects and benefits. Consumer safety, in particular, is a central consideration. Good skin-compatibility is one of the aspects considered, as is avoidance of the possible sensitizing potential of certain groups of ingredients. When a product developer formulates a new skincare cream such as, for example, the innovative product Bio-Cohesion, which was launched in 1998, a comprehensive test program is carried out, which has proven itself over a period of years. The program includes dermatological and in vitro tests (tests that do not make use of experimental animals). Some of these, now generally accepted, alternative test methods were developed on the initiative of Henkel's toxicologists in cooperation with specialist institutes and universities.

New action principle with vegetable raw materials

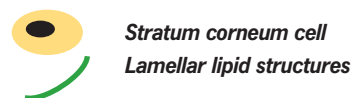
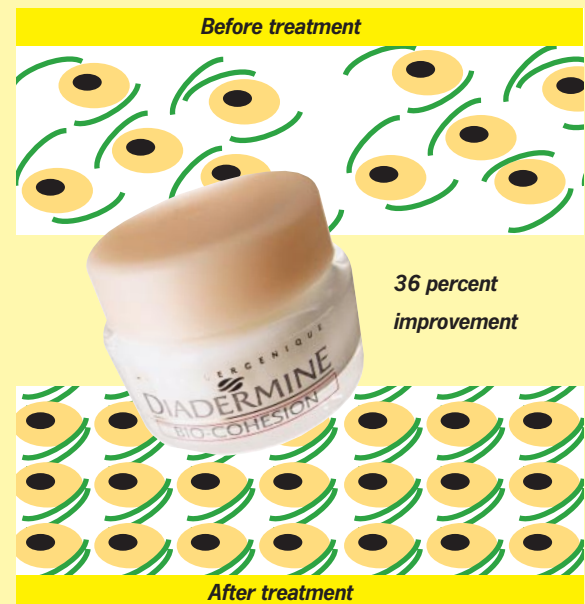
One of the objectives adopted by the Cosmetics/Toiletries business sector in 1997 was to use more renewable vegetable raw materials. That it has been successful is exemplified by the new Bio-Cohesion range of care products for day or night application and for the eyes. If the water content of the formulations is left out of consideration, 70 percent of the ingredients are vegetable-based. These new formulations had a storybook start, winning a large share of the highly competitive markets in Belgium, France, Portugal and Spain.

Their success is attributable to a new action principle. The cream has the same microscopic lamellar structure as the upper layer of the skin. It is absorbed very easily by the skin, protects it against environmental factors, regulates its moisture balance, and gives it a smooth, young appearance.

The development team was presented with the 1998 Fritz Henkel Award for Innovation for its work on this project.

Restructuring the upper layer of the skin

Structure of the upper layer of the skin



The A.I.S.E. Code is now official

As a member of the A.I.S.E. (Association Internationale de la Savonnerie, de la Détergence et des Produits d'Entretien), which is the European detergent producers association, Henkel was actively involved in establishing a Code of Good Environmental Practice, defining environmental objectives that should be achieved by the year 2001 (see page 51). In 1998, the Commission of the European Union adopted this commitment as an EU-wide recommendation.

Independent external verifiers audit the detergent companies to ensure that the data reported to the association are correct. Such an audit was carried out at Henkel in the fall of 1998.



Banishing the problem of detergent overdosing

In May 1998, the Detergents/Household Cleansers business sector launched the first-ever universal detergent in tablet form in France. Italy, Germany, Austria and Switzerland soon followed, as did the Benelux countries in early 1999.

The “tabs” are Henkel’s solution to an environmental problem that has taxed its ingenuity for some time – the permanent tendency of some consumers to overdose detergents. As the life cycle assessments show, the burden of detergents on the environment is greatest during the wash cycle (see page 25). The washing active substances enter domestic wastewater, and if too much product has been used, more of them will do so than necessary. The tabs eliminate the problem of overdosing. Deutsche Umwelthilfe e.V. (a German environmental organization) has welcomed the development of detergents in tablet form as “perhaps the most crucial new development in the field of detergents.” The German magazine for ecology in everyday life, ÖKO-TEST, which is known for its expert critical analyses, described the tabs as “ecologically worthwhile.”

At first sight, the packaging of the tabs appears excessive. The tabs are packaged in pairs. They are very compact, however, and thus only use six percent more packaging material than a packet of Megaperls. This figure does not reflect the abolition of dispensing aids (beakers, eco sacks).

Unbeatable in terms of saving packaging material is the Megaperls refill pouch, which requires only one fifth of the packaging material of the packet. This advantage over the tabs only applies, however, when users dose the Megaperls properly.



The solution to an environmental problem: Place two tabs in the detergent compartment of the washing machine, and detergent overdosing is a thing of the past.

Henkel’s detergent in tablet form has found favor with the consumers. Henkel’s product developers and marketing experts predict that the especially simple and convenient handling will gradually wean users away from traditional washing powders to tabs. The market share of the tabs is expected to reach the 20 percent milestone by the year 2000.



Computer simulation. The path of detergent components in rivers is traced on the screen.

Ecological information

The substances that make up detergents and household cleansers end up in wastewater after use. In 1958, Henkel started to measure the concentrations of key detergent components, such as surfactants, in German rivers. This was long before government agencies and scientific institutes took up this topic. The measurement results shed light on the paths and destinations of chemicals in the environment and thus provided valuable help in the development of environmentally more compatible formulations.

Today the concentrations of the monitored detergent components in German rivers are very low. Low dosages per wash cycle, favorable biodegradation properties, and efficient sewage treatment plants have made a major contribution to this state of affairs. The specialists in Düsseldorf are now turning their attention to smaller watercourses, where it

is more likely that peak loads will occur. Against this background, Henkel and other detergent and surfactant manufacturers, together with independent research organizations and universities, have jointly produced a computer model to calculate the concentrations of detergent components and other household chemicals in watercourses. This joint project was christened GREAT-ER (Geography Referenced Exposure Assessment Tool for European Rivers).

Together with a clear representation of the predicted concentrations on electronic maps, GREAT-ER will draw the first comprehensive picture of the surface water loads in Europe. Depending on the result of the ecological assessment of the load situation, the necessary measures to improve the quality of surface waters can then be selectively introduced.



Save water and energy

Membrane technology as a complete service package

H.E.R.O. (Henkel-Ecolab Reverse Osmosis) is the name of a water purification system developed by Henkel-Ecolab together with a Dutch equipment manufacturer. With the help of membrane technology, the wash water used in industrial and institutional laundries can be purified to such an extent that most of it can be recycled into the washing process.

The development of H.E.R.O. conforms to Henkel-Ecolab's objective of providing clients with products and systems that contribute to saving resources and improving environmental protection. This is why the plant is designed so that it can easily be incorporated in existing large-scale washing machines. This saves not only water, but also energy, because in contrast to cold freshwater, the purified water is fed into the rinse cycle at a temperature of 60 degrees Celsius. The hot water rinses more intensively, and the rinsed items have a lower residual water content. Energy is thus also saved during drying.

A complete service package from Henkel-Ecolab, including detergents and laundry aids geared to the specific system, as well as membrane cleansing products, guarantees laundries a high level of reliability.

An industrial or institutional laundry, which processes 50 metric tons of washing per week, can save around 400,000 liters of freshwater each week with the help of H.E.R.O. and only needs around two liters of freshwater per kilogram of dry washing.

Enzymes instead of alkalis

Henkel-Ecolab is currently developing a cleaning system based on enzymes to the stage where it is ready for marketing. The system is intended for use in dairies that produce fresh milk, ultra-high temperature sterilized milk, and milk powder. The use of enzymes for such cleaning tasks is so new, and the prospects of success are so good, that a patent for the process has already been applied for.

The cleaning problem is the presence of encrusted protein and calcareous deposits in pasteurization units where milk is sometimes heated to 140 degrees Celsius. Dairies have to clean such pasteurizers almost daily, because around 30,000 liters of milk flow through the heating coils each hour. Cleaning is traditionally carried out in two stages. The first of these involves the use of 5-percent sodium hydroxide solution at temperatures of 85 to 140 degrees Celsius (depending on the type of pasteurizer). After one rinsing cycle, a roughly 1.5-percent nitric acid solution at 75 degrees Celsius is allowed to work on the encrustations. Finally, a thorough rinse must be carried out.

Henkel-Ecolab's product developers have formulated an enzymatic cleanser that can be used instead of the concentrated alkali. It functions at 50 to 60 degrees Celsius and is so effective that the subsequent acid treatment can be carried out with acid at half of the previously needed concentration. Because the alkali and part of the acid are no longer needed, the new cleaning system reduces the amount of inorganic salts in the wastewater. Less freshwater is needed for the rinse cycle, because the enzyme cleanser can be rinsed out more easily. And finally, a considerable amount of energy is saved due to the lower cleaning temperature.

Safe and precise dosing

Henkel-Ecolab has developed and marketed two new dispensing systems for different fields of application in industrial and institutional cleaning. Both were designed to avoid overdosing and skin contact with the highly concentrated product when the ready-to-use cleansing solution is prepared by the employees of the cleaning company.

Wherever floors, surfaces, and sanitary areas have to be cleaned – in administrative or office buildings or hospitals – the necessary cleansing solutions must no longer be prepared manually, with a greater or lesser degree of accuracy, from the concentrated cleanser and water with the help of a measuring beaker. The new stationary dispensing unit from Henkel-Ecolab carries out this task exactly. Employees cannot come into contact with the concentrate. Most clients install the dispensing unit in the area where the cleaning equipment is kept. The amount of cleansing fluid needed for one shift is drawn off and placed on the work trolley, then the teams of cleaners go about their tasks.

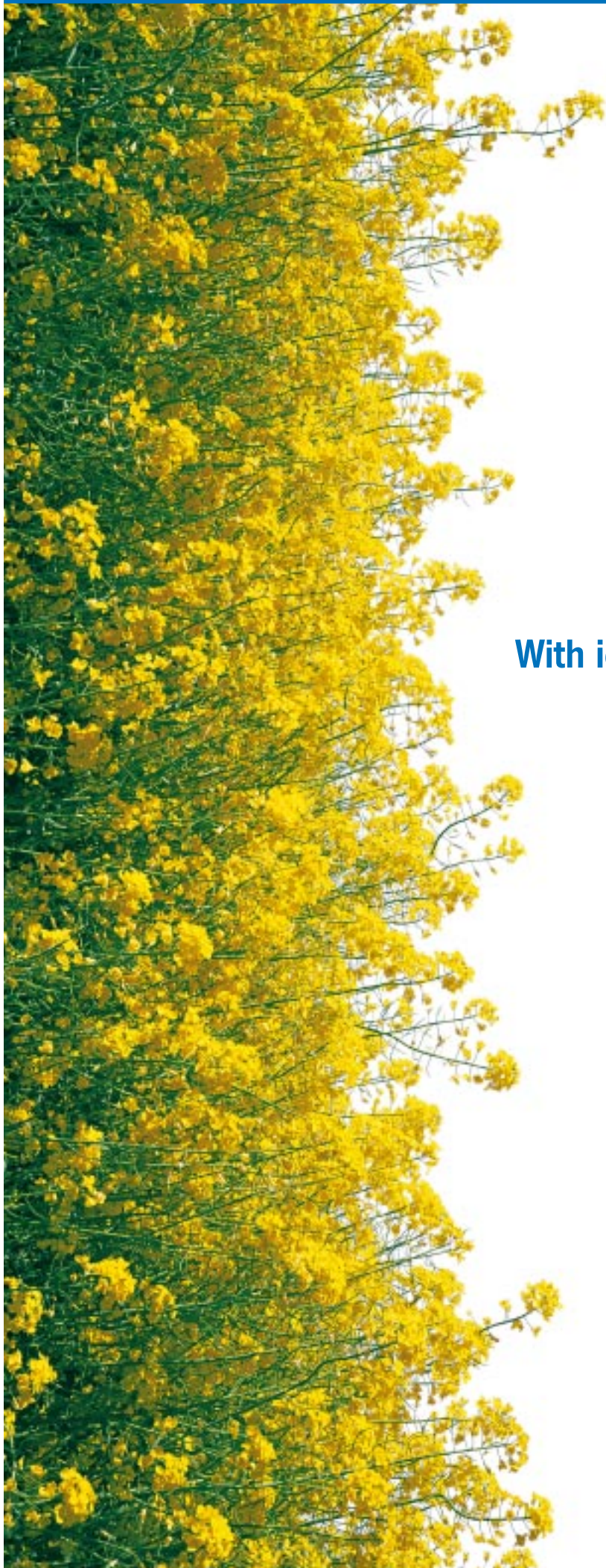
Where floors covering thousands of square meters have to be cleaned with automatic machines, such as in supermarkets or in airports, the second new design from Henkel-Ecolab takes over the task of filling the machines with fresh, ready-to-use cleansing solution. It, too, dispenses very accurately and fills the automatic cleaners in less than one minute. In contrast, more than 20 minutes are usually needed to fill the machine manually with the necessary 200 to 300 liters of cleansing solution. This is an additional reason for clients to use the new dispensing unit.

Ecological information

Product developers at Henkel-Ecolab always bear two things in mind with regard to disinfectants and numerous other products. On the one hand, customers want these products to reliably destroy microorganisms, but on the other, the formulations must also be environmentally compatible. For this reason, microbicides that are readily biodegradable in wastewater are used whenever the client's hygiene requirements permit this. Such microbicides lose most of their lethal properties before they reach the sewage treatment plant.

Where extremely high levels of hygiene are essential, for example, in operating theaters in hospitals, it is necessary to use substances that efficiently destroy a broad range of

microorganisms. Some of these active agents degrade very slowly. To ensure that they can be used without causing harm to the environment, the experts at Henkel-Ecolab and in Henkel's Biology/Product Safety central organizational unit fall back on exposure analyses. These analyses predict the concentrations of bactericides in sewage treatment plant inflows, for example, and in discharges to surface waters under realistic worst case conditions. A newly developed product cannot harm the environment if the calculated concentration is below the threshold concentration at which ecotoxicological effects on organisms in the environment can be expected to occur.



With ideas and creativity



Production sites throughout the world

It would be impossible for the Henkel Group to report on all SHE activities and improvements at its sites within the confines of this publication. The following chapter therefore gives a region-by-region overview of the major production sites of the Henkel Group. The results of the SHE audits are shown for each region. Examples of improvements in environmental protection and safety, and of the start-up of new production plants, are also given.

Site portraits

The Henkel Group's new, expanded communications concept also provides for site-related reporting. Site portraits in the local language will supplement the Group report and provide up-to-date, detailed information to neighbors, regulatory bodies, and the public. The first portraits will appear in 1999.

The published environmental statements of the sites certified under the European Union's Eco-Management and Audit Scheme (see page 14) are available free of charge on request. Alongside printed publications, Henkel intends to make increasing use of electronic media such as the Internet.

Responsible Care

Responsible Care is a worldwide initiative of the chemical industry. It is intended to promote continuous improvement in safety and the protection of health and the environment, independently of legal requirements. The initiative is being implemented by national chemical industry associations in more than 40 countries.

Henkel's SHE management system covers the requirements resulting from the Responsible Care initiative. In many countries, recently joined by Morocco, Henkel Group companies are pioneering the national implementation of Responsible Care.

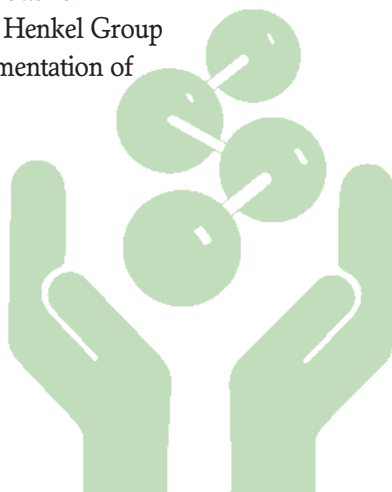
Objectives not achieved

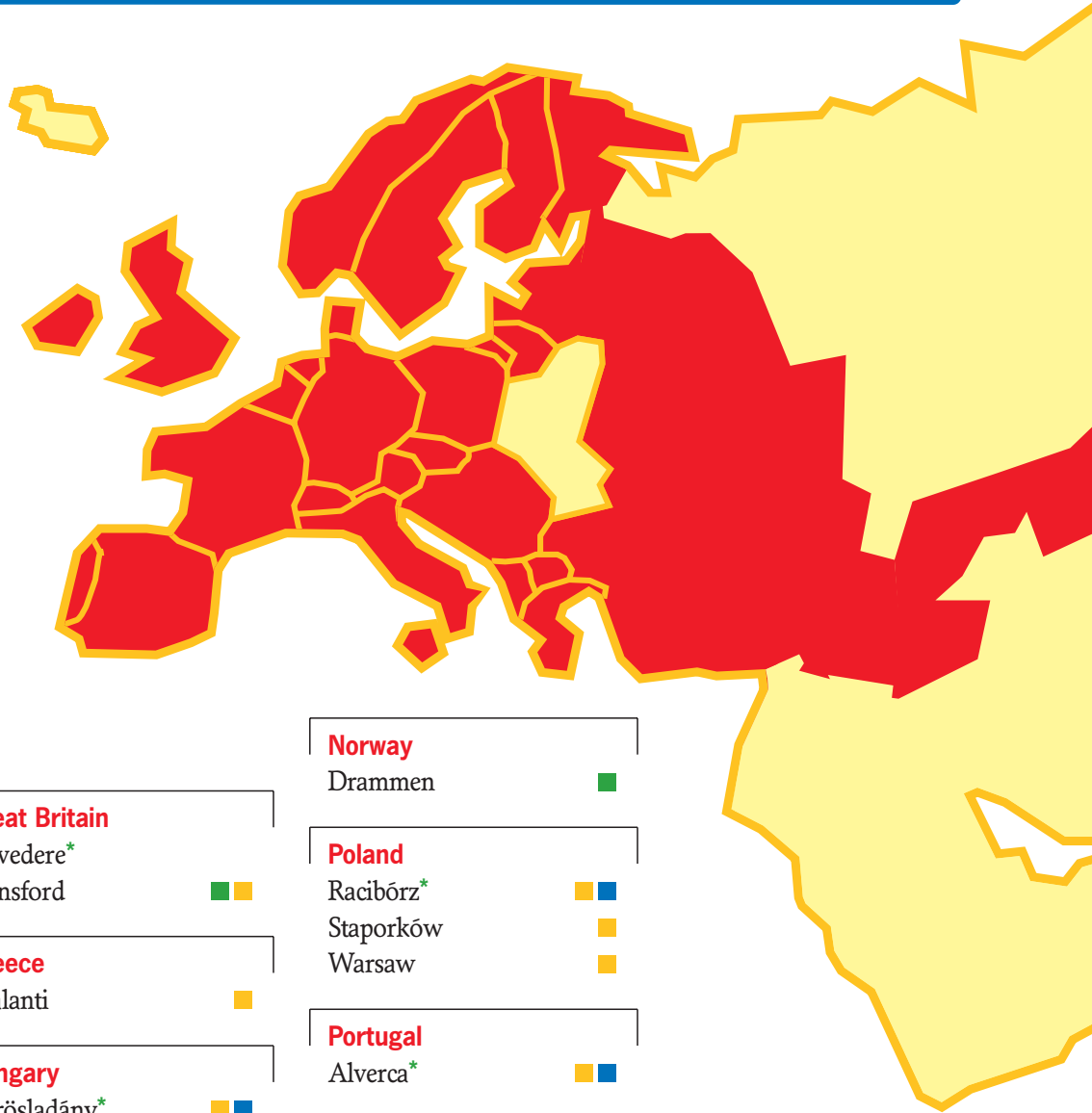
USA: The Cincinnati, Ohio, site where oleochemical base materials and specialty chemicals are produced, failed to achieve one of its objectives. The organic load of the site's wastewater should have been reduced by 10 percent within one year (see page 54). The cause of the shortfall was a number of initially inexplicable disturbances in the sewage treatment plant. The specialists in Cincinnati are now convinced that they have the problem under control, in view of the fact that, at the end of 1998, the daily wastewater load was nearly 20 percent down from the previous year.

More than 400 employees produce specialty chemicals and vitamin E at the site in Kankakee, Illinois. They wanted to reduce emissions of volatile organics by connecting more operational units to an already existing exhaust air incineration plant. Unfortunately, the plant did not thermally oxidize the organic substances as efficiently as expected. The site is now looking for an alternative technical solution that will avoid emissions at the source.

France: Henkel France's production sites in Nemours and Ponthierry employ more than 200 people and produce detergents and fabric softeners. Their target was to reduce the amount of production waste that has to be disposed of in landfills by 10 percent (Nemours) and 60 percent (Ponthierry) (see page 52). However, the picture changed completely when the range of products manufactured at the two sites was extensively reshuffled in the context of measures aimed at optimizing production structures. Changing the range of products also changes the quantities of waste.

Whether the production teams at the sites would have met their target if these changes had not been carried out is a matter of pure speculation. What is certain is that the company's employees are doing everything they can to avoid creating waste. Despite increases in production in the detergent plant at Nemours in 1998, the amount of landfill waste was no higher than in 1996. And in Ponthierry, it was 34 percent lower!





Austria	
Vienna*	■ ■

Belgium	
Herent*	■ ■ ■
Tessengerlo	■

Denmark	
Valby	■

Finland	
Helsinki	■
Riihimäki*	■
Vantaa*	■

France	
Boussens*	■
Châlons-en-Champagne*	■
Châlons-sur-Marne	■
Cosne-sur-Loire	
Lièpvre*	
Louviers*	■ ■
Meaux*	■ ■
Nemours*	■ ■
Ponthierry*	■ ■
Reims*	■ ■
Yainville*	

Germany	
Bopfingen	
Düsseldorf-Flingern*	■ ■ ■
Düsseldorf-Holthausen*	■ ■ ■
Genthin*	■ ■
Hanover*	■ ■
Heidelberg*	■ ■ ■
Heidenau	■
Herborn-Schönbach*	■ ■ ■
Illertissen*	■ ■ ■
Krefeld	■ ■
Loxstedt*	■ ■
Magdeburg*	■ ■
Neesen	
Sankt Augustin	■
Siegburg*	■ ■ ■
Unna	■
Viersen-Dülken	
Wassertrüdingen*	■

Great Britain	
Belvedere*	
Winsford	■ ■

Greece	
Atalanti	■

Hungary	
Körösladány*	■ ■
Vác	■ ■

Ireland	
Ballyfermot*	■
Cork*	■ ■
Tallaght*	■

Italy	
Caleppio di Settala*	
Campo di Bisenzio	■
Casarile	■
Ferentino*	■ ■
Fino Mornasco*	■
Lomazzo*	■ ■
Parma	
Rozzano	■
Zingonia/Bergamo	■

Netherlands	
Nieuwegein*	■
Ravenstein*	■

Norway	
Drammen	■

Poland	
Racibórz*	■ ■
Staporków	■
Warsaw	■

Portugal	
Alverca*	■ ■

Russia	
Engels*	
Tosno*	

Slovenia	
Maribor*	■

Spain	
Barcelona/Zona Franca*	■ ■ ■
Barcelona/Zona Terrassa	■
La Coruña*	■
Malgrat*	■ ■
Montornés*	■ ■
San Adrián*	■ ■
Seville/Santa Perpétua	■
Alcalá de Guadaira*	■ ■

Sweden	
Mölnal*	■ ■

Switzerland	
Erlinsbach	■

Turkey	
Cayırova*	■ ■
Izmir*	■

* One of the 88 sites contributing to the Group data
 ■ Certified to ISO 14001 and/or EMAS
 ■ SHE audit carried out
 ■ Objectives published

SHE audits: Good results with one exception

In 1998, SHE audits were carried out at 32 European sites. These audits contribute to the continuous improvement of the SHE situation at the sites (see page 15). The audits documented a high overall SHE standard.

At one recently acquired site, the verifiers and the responsible production personnel found considerable safety deficits. Shortcomings and potential for improvement were identified in occupational safety, handling of volatile substances, storage of hazardous substances, and waste management. Those responsible reacted immediately and drew up a program for eliminating the worst deficits. The necessary investment resources were quickly made available. The most serious shortcomings had been remedied by the end of 1998. In 1999, the audit will be repeated.

Responsible Care implemented

Austria: Henkel's SHE Management System covers the requirements of the chemical industry's worldwide Responsible Care initiative, which promotes continuous improvement in safety, health and environmental protection. The association of the Austrian chemical industry (FCIO) is the only European association to have drawn up a national system for auditing compliance with the requirements of Responsible Care. Henkel Austria, which has its head office in Vienna, has grasped this opportunity. The company, which employs almost 1,000 people and markets 2,000 branded articles, was successfully audited by accredited external verifiers and, in February 1999, received the FCIO certificate.

Noise stop

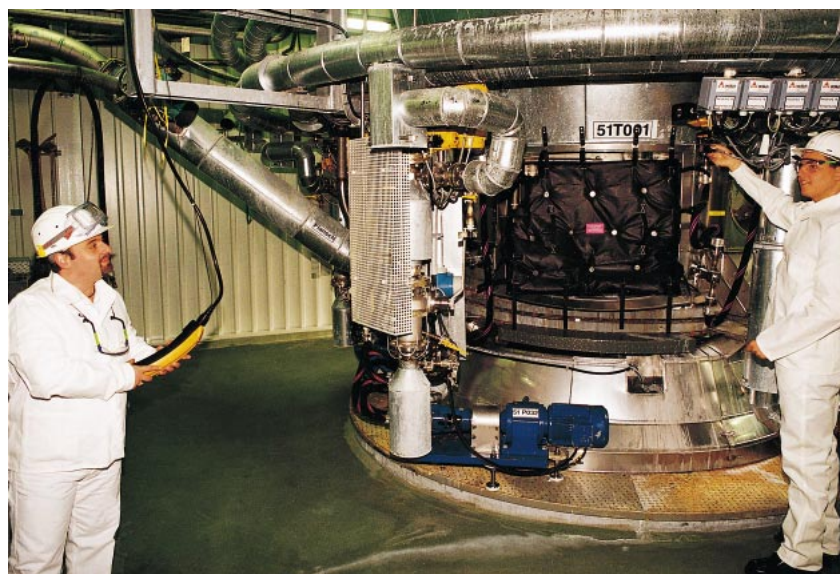
France: Neighbors of Henkel France's Louviers site, where around 50 employees produce adhesives, complained about excessive noise. Their complaints were justified. A noise level of 71 decibels (A) was measured in the vicinity of the site. This was clearly in excess of the permissible limit of 65 decibels (A). The main cause was an undamped compressor. It has been soundproofed, and the noise level in the neighborhood of the site is now about 61 decibels (A). Because the scale of measurement is logarithmic, this means that the noise level is actually only one tenth of its previous magnitude.

Environmental logistics

France: The employees of Henkel France's detergent plant in Reims are proud to have achieved a significant reduction in packaging materials and transport trips. By improving production conditions, thus achieving an increase in the relative density of the product, they were able to reduce the size of detergent packages in 1998. This brought about a saving of 16 percent, equivalent to 1,200 metric tons of packaging material. Even better, 10 percent more cartons now fit on the shipping pallets. This means that a truck can now carry more detergent per tour to the company's customers. As a result, 600 fewer trips are needed per year

Integrated environmental protection

Germany: Henkel Düsseldorf's new production line for granulated washing active substances, which started operations in 1998, incorporates many innovations and benefits. Granulates are in demand by customers as a complement to surfactant pastes, which contain 20 to 60 percent water. Thanks to the granulates, less water has to be transported. The granulates emit no dust and can be easily processed. The line, which currently has an output capacity of 10,000 metric tons per year, employs the modern fluidized-bed drying process. It can also be used to produce detergent premixes with ecologically favorable properties.



The heart of the new Düsseldorf production line for granulated washing active substances. A surfactant paste is sprayed into the fluidized-bed drier.

Postponed, but not canceled

Ireland: Henkel Ireland in Cork employs 120 people and produces auxiliaries and additives for the detergent, food, pharmaceutical, and metal extraction industries. It has set ambitious targets for reducing emissions from its steam and electricity generation systems (see page 52). The planned steep cuts in the amounts of pollutants emitted were to be achieved by modernizing the boiler house and switching to cogeneration. The new plant did not initially bring about the anticipated reduction in emissions, and as a consequence numerous improvements were carried out during 1998. Measurements will be taken in 1999 to monitor the success of these steps, and the results should be reported in the year 2000.

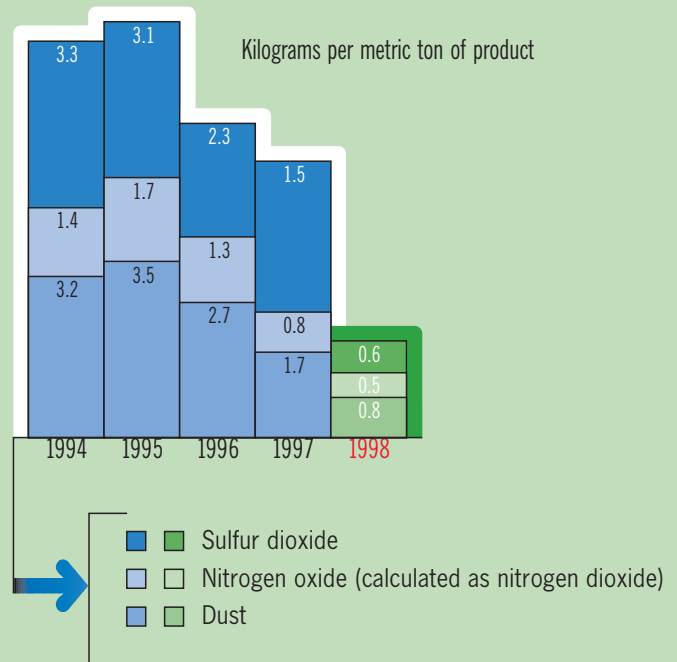
Improving the efficiency of steam generation was one of the individual measures specified in Henkel Ireland's far-reaching environment program, which was drawn up in 1998 and covers the period up to 2003. The other measures are mainly aimed at avoiding emissions to water and the air, generating less waste, and lowering noise levels. Henkel Ireland will report on the progress achieved.



Emergency drills at Henkel. The fire departments at the individual sites carry out such drills regularly. The scene shown here was photographed during a large-scale exercise in Düsseldorf in October 1998. Cooperation with public emergency services is also rehearsed.

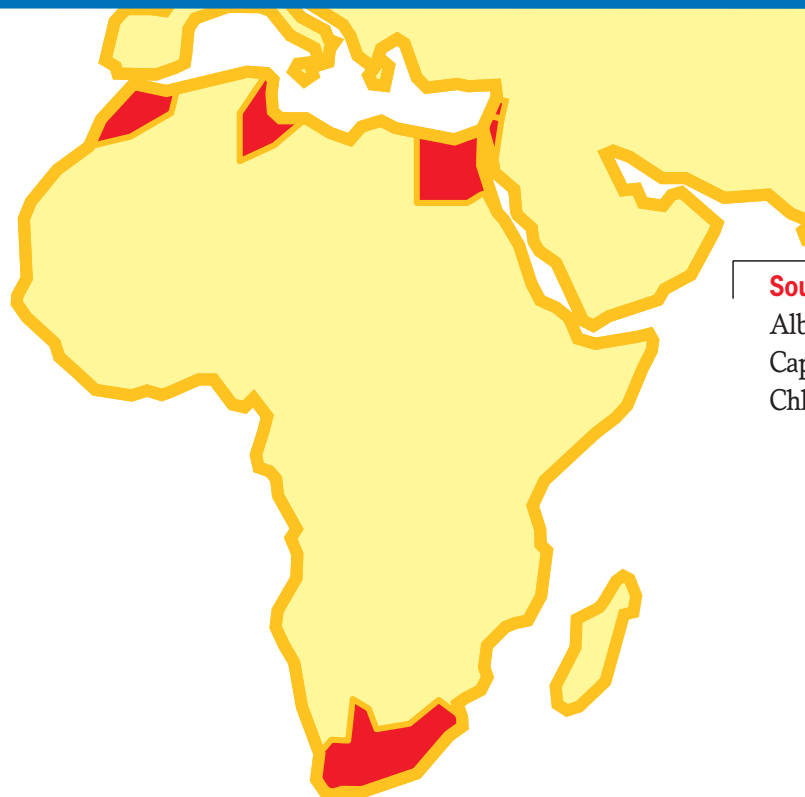
Rigorous cuts in emissions

Poland: Management and employees of Henkel Polska in Racibórz have worked consistently and very successfully at reducing emissions from their power plant during the past three years (see page 53). Around 400 people are employed at the site, whose products include detergents, household cleansers and soaps, as well as sulfonic acids and glycerine. The large cuts in emissions during power generation were achieved by a switch in fuel from coal to natural gas. Because production output has increased steeply in Racibórz since 1994, the bar chart shows the specific emissions to the air in kilograms per metric ton of product.



Site certification

Accredited external verifiers have so far certified 17 of Henkel's European sites to the ISO 14001 international environment management standard and/or the European Union's Eco-Management and Audit Scheme (EMAS) (see page 14). Another 15 sites want to achieve certification by the end of the year 2000 (see pages 52 to 54).



Egypt

Port Said*



Israel

Haifa*

South Africa

Alberton-Alrode*



Cape Town



Chloorkop



Lebanon

Beirut



Tunisia

Tunis*

* One of the 88 sites contributing to the Group data

■ Certified to ISO 14001

■ SHE audit carried out

■ Objectives published

SHE Audits:

Showing things in a new light

SHE audits were carried out at four sites in the region. In general, they were found to have a good to satisfactory SHE Standard.

At one production site, however, the auditors discovered a source of danger in the production line, which until then had been totally underestimated by the site's management team. Immediate action was taken to eliminate this serious safety risk.

At one site, the number of occupational accidents was well above the average for the Henkel Group. The audit drew the attention of the responsible site managers to the need to improve occupational safety. The auditors' calculations also revealed that the human suffering caused by accidents is accompanied by a high level of economic loss.

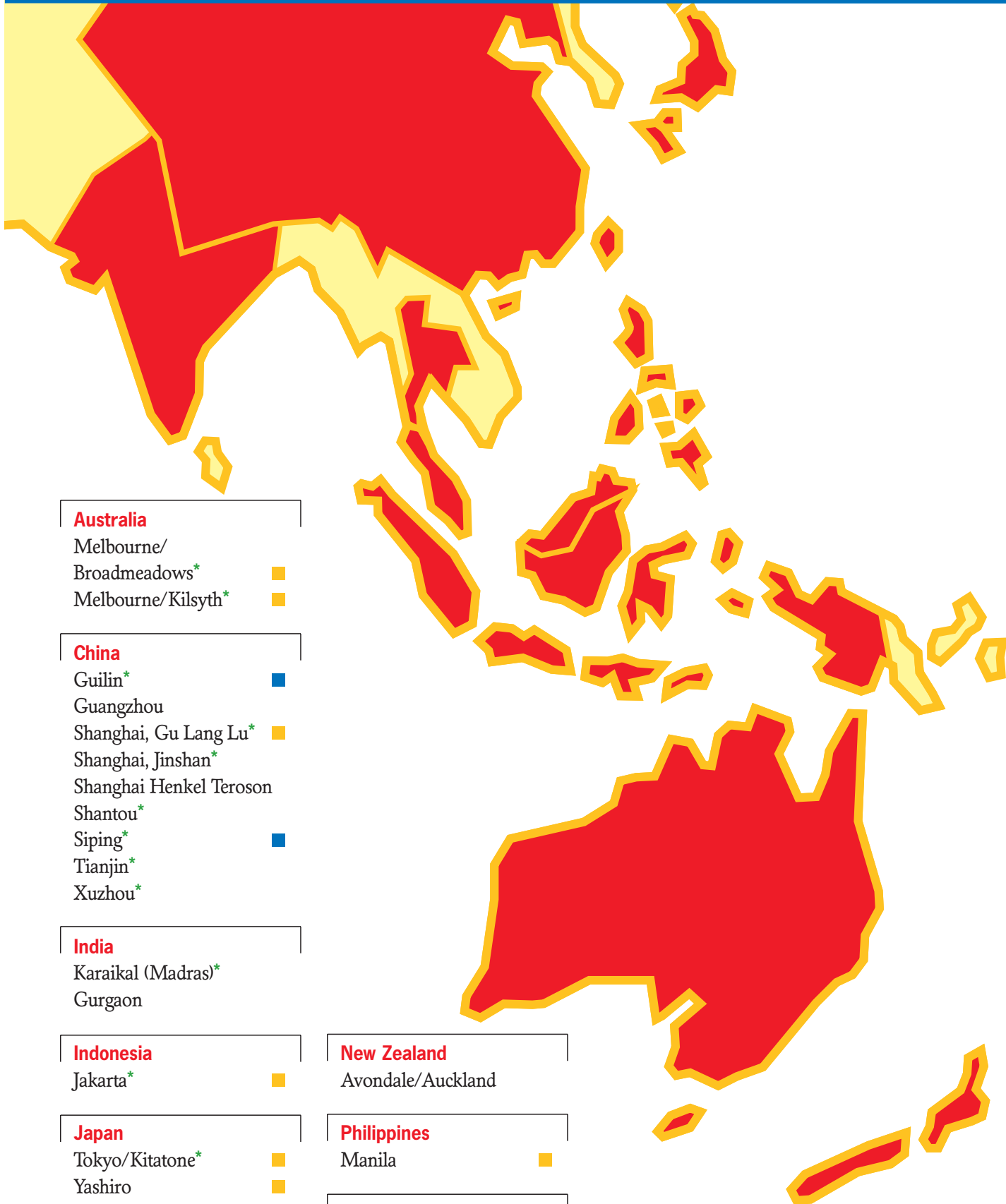
Commitment to Responsible Care

Morocco: In 1998, the International Council of Chemical Associations (ICCA) accepted Morocco into the group of Responsible Care countries, which now numbers more than 40 members. Henkel Maroc was one of the first Moroccan companies to subscribe to the basic principles of Responsible Care. The presence of government representatives and the press at

the signing ceremony organized by the FCP (the Moroccan chemical association) was a clear indication of the importance they attach to the implementation of the Responsible Care initiative in the industry. Henkel Maroc has a tried and proven instrument at its disposal in the form of the Henkel SHE Management System.

Wastewater-free production

Egypt: In the Egyptian city of Port Said, around 400 Henkel employees produce detergents and cosmetic products. At one time, it seemed that the company would have to invest heavily in a wastewater treatment unit to enable it to comply with official requirements. However, its experts found an alternative solution. They restructured the production processes so that all of the rinse water could be reutilized as process water. Alongside the essential construction work, including the installation of a collection tank for the rinse water, it was also necessary to carry out an intensive program of measures to raise levels of employee awareness and training. The project was a success, and all process water outlets from the production building to the sewerage system have now been closed off.



Australia	
Melbourne/ Broadmeadows*	■
Melbourne/Kilsyth*	■

China	
Guilin*	■
Guangzhou	
Shanghai, Gu Lang Lu*	■
Shanghai, Jinshan*	
Shanghai Henkel Teroson	
Shantou*	
Siping*	■
Tianjin*	
Xuzhou*	

India	
Karaikal (Madras)*	
Gurgaon	

Indonesia	
Jakarta*	■

New Zealand	
Avondale/Auckland	

Japan	
Tokyo/Kitatone*	■
Yashiro	■

Philippines	
Manila	■

Malaysia	
Telok	■ ■
Panglima Garang*	
Kuala Lumpur	

Taiwan	
Chung Li/Taipei	■

Thailand	
Bangkok*	

* One of the 88 sites contributing to the Group data
 ■ Certified to ISO 14001
 ■ SHE audit carried out
 ■ Objectives published

SHE Audits: The top priority is safety

SHE audits were carried out at six sites in the region in 1998. In general, they were found to have a good to satisfactory SHE standard.

At one site, the team of auditors encountered a newly set-up production line. The raw materials processed there had a far higher danger potential than the other substances used at the site. The occupational safety concept was no longer adequate to the demands made on it. Employees who had to work with the dangerous substances were not sufficiently protected. Fire protection, emergency preparedness measures, storage, waste management, and measures to prevent accidental discharges into the sewage network were no longer equal to requirements. The new production line was promptly taken out of operation. A start was immediately made on eliminating the identified shortcomings. The site's manager was given a written warning.

New sulfation plant

Thailand: Henkel Thailand has started up a new sulfation plant in Bangpakong industrial park, near Bangkok. The facility, which incorporates the latest technology, produces anionic surfactants for detergents and household cleansers. The modern production process operates at a high level of plant safety and yields top quality products. It also results in considerable environmental benefits. For example, the demineralized water that the plant needs is obtained by a process based on reverse osmosis, which is favored by the local conditions, rather than the use of ion exchangers. This means that large amounts of salt-rich water are neither produced nor discharged.

Henkel assigned a high priority to occupational safety even during the construction phase. Although the plant was built in just 13 months to a very tight deadline, and sometimes up to 400 people were working simultaneously on the building site, not a single serious accident occurred.

Accident-free

India: In 1998, the implementation of extensive awareness-raising and training measures for the 160 employees was given high priority at the Karaikal site in India. Fire-fighting and first-aid drills were also held. As a result of these measures, not a single reportable accident occurred in 1998.

A newly constituted Safety Audit Team has started work to ensure that the standard of safety is maintained and improved. The Karaikal site produces detergents, soaps and zeolites. In addition, a start has been made on establishing a green belt around the site. A new area will be planted each year.

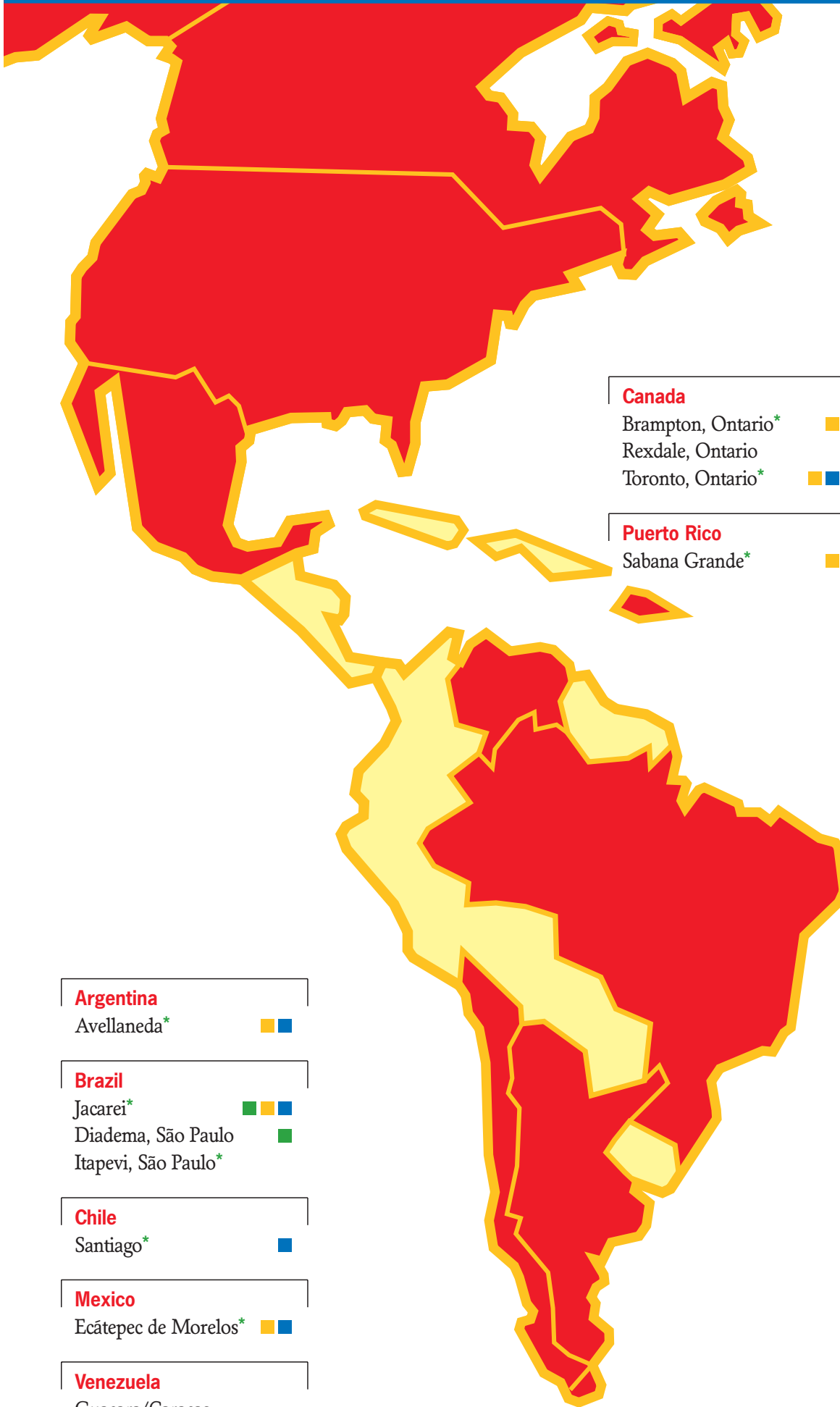
Oil brings benefits

China: The Chinese detergent plant at Guilin has modernized its steam generation. Instead of coal, oil is now the preferred fuel. The new boiler emits only 75 metric tons of sulfur dioxide per year instead of the previous 625. Although the old coal-fired boiler was fitted with a dedusting system, there were still some dust emissions to the atmosphere. These have now been completely eliminated. The oil-fired boiler has no need of the old dust scrubbers, and this alone saves 120,000 cubic meters of fresh water and reduces the volume of wastewater by the same amount each year.

The new objective of the almost 500 employees at Guilin is the systematic reduction of the site's wastewater load. As a first stage, the site's experts are determining the contribution of each production section to the total wastewater load. The results obtained at the individual measurement points are documented in a wastewater register, which will be completed by the end of 1999.



New sulfation plant for the production of surfactants in Thailand. The plant incorporates the latest technology and is environmentally compatible. It is located on Henkel Thailand's new 80,000 square meter lot.



Canada

- Brampton, Ontario* ■
- Rexdale, Ontario ■
- Toronto, Ontario* ■ ■

Puerto Rico

- Sabana Grande* ■

USA

- Atlanta, Georgia* ■
- Aurora, Illinois ■
- Brooklyn, New York ■
- Calhoun, Georgia ■
- Charlotte, North Carolina* ■ ■
- Cincinnati, Ohio* ■ ■
- Cleveland, Ohio* ■
- Elgin North, Illinois ■
- Elgin South, Illinois ■
- Fremont, California ■
- Hayward, California ■
- Hoboken, New Jersey* ■
- Jackson, Tennessee ■
- Kankakee, Illinois* ■ ■
- Kansas City, Kansas* ■
- Lewisville, Texas ■
- Livonia, Michigan* ■
- Lock Haven, Pennsylvania* ■ ■
- Mauldin, South Carolina* ■
- Oak Creek, Wisconsin* ■
- Solon, Ohio ■
- St. Louis, Missouri ■
- Tucker, Georgia ■
- Warren, Michigan* ■
- Wayne, New Jersey ■

Argentina

- Avellaneda* ■ ■

Brazil

- Jacarei* ■ ■ ■
- Diadema, São Paulo ■
- Itapevi, São Paulo* ■

Chile

- Santiago* ■

Mexico

- Ecâtepec de Morelos* ■ ■

Venezuela

- Guacara/Caracas

* One of the 88 sites contributing to the Group data
■ Certified to ISO 14001
■ SHE audit carried out
■ Objectives published

SHE audits: No critical cases

SHE audits were carried out at 13 sites in the USA and Canada in 1998. They confirmed the sites' compliance with the legal requirements and the specifications of the Henkel SHE standards and guidelines. Nevertheless, a number of opportunities for improving plant safety and reducing emissions were identified. The sites are now implementing the measures recommended after the audits.

Accident-free

USA: The almost 700 employees of the large chemical products site at Cincinnati, Ohio, have set a new record in accident-free operations. During the course of 1998, they passed the one million hours mark, and by the end of the year they had worked 1,360,000 hours without a single accident that resulted in even one day of lost time. This success was achieved by teamwork between management and employees who jointly developed occupational safety improvement programs and goals to ensure that safety is maintained at a high level.

Community outreach program

Canada: Employees of the Toronto site, where fatty acids are produced for the cosmetics and food industries, have contacted more than 1,000 of the site's neighbors. As part of the process of implementing the Responsible Care philosophy, the employees introduced the company to local residents and addressed their concerns. In particular, residents were asked whether they had ever suffered any inconvenience due to the plant's operations. Only a few mentioned occasional unpleasant odors or noisy alarms during the night. Quick action was taken to eliminate the noise, and a major odor abatement project was started.

The response to these visits was very positive, and the initiative played a big part in building up trust.

Methylene chloride is "out"

Puerto Rico: Loctite in Puerto Rico employs around 300 people and produces engineering adhesives. The use of methylene chloride, a chlorinated hydrocarbon, was discontinued in 1998. It was replaced by an environmentally more compatible solvent. As a result, fugitive emissions of 14 metric tons per year of methylene chloride to the atmosphere have been eliminated.

No sniffing

Chile: Henkel Chile stopped using toluene in the production of adhesives at its Santiago site three years ago. Adhesives that contain toluene can be misused as an intoxicant by glue-sniffers. Henkel was the first company in Chile and South America to stop using toluene. In December 1998, the Chilean Minister of Health presented the company with the national health award in recognition of its pioneering role in dispensing with toluene. On December 24, 1998, prompted by Henkel's trail-blazing example, the Chilean president signed a law forbidding the production and marketing of toluene-based adhesives.



Proud of environmental certificate

Brazil: In 1998, as one of the first companies in Brazil, the Jacarei site of Henkel Indústrias Químicas was certified to the ISO 14001 international management standard by accredited external verifiers. Around 400 employees produce organic specialty chemicals and adhesives in Jacarei. The workforce is proud of this achievement, but is determined not to rest on its laurels. An environment program including more than 20 individual items has been launched. Especially pleasing is that, while the program was being drafted, it was found that many significant improvements can be achieved without high investment costs.



Ambitious objectives



The continuous improvement of safety, health and environmental protection in a company should be a systematic process, transparent to both internal and external observers. The first step is to set ambitious but attainable objectives, which must be pursued consistently. Henkel publishes its objectives and reports its annual progress toward their ultimate attainment. The wide variety of objectives described in this chapter gives an impression of the multifaceted improvement programs currently being implemented in the Group.

Environment program for products

The following two pages show the development objectives of the product divisions - subject, naturally, to the constraints of competitive considerations. Page references in the status column indicate that more detailed information can be found in the Products chapter.

Environment program for production

The Henkel Group's efforts to reduce its emissions and its consumption of resources start at the individual sites. The overview shows the Henkel Group sites that have set objectives and gives brief descriptions of these objectives. Due to lack of space, it is only possible to show one of several objectives for some of these sites.

The challenging nature of these objectives is confirmed by the fact that not all of them are achieved. When necessary, objectives are explained in the Production chapter.

Environmental data

SHE performance indicators are an important management instrument, with which opportunities of making improvements in environmental protection and safety can be identified, ongoing measures can be controlled, and progress towards the attainment of objectives can be monitored. Performance indicators are also a suitable aid for communicating the status and progress of environmental protection and safety in the Company to the public.

The Henkel Group indicators published in the Environmental Data section correspond to a large extent to the core data set recommended by the European Chemical Industry Council (CEFIC). Where this is not the case (for example, transport safety data), Henkel is setting up data collection systems. The Henkel Group's emissions of phosphorus and nitrogen compounds in wastewater are negligible.

SHE data from 35 countries

Argentina	Hungary	Russia
Australia	India	Slovenia
Austria	Indonesia	South Africa
Belgium	Ireland	Spain
Brazil	Israel	Sweden
Canada	Italy	Thailand
Chile	Japan	Tunisia
China	Malaysia	Turkey
Egypt	Mexico	USA
Finland	Netherlands	
France	Poland	
Germany	Portugal	
Great Britain	Puerto Rico	

The SHE performance indicators are determined at 88 Henkel Group production sites in 35 countries and are aggregated to obtain the Group data. The 88 sites have been selected on the basis of their production volumes, the quantities and types of resources they consume, and their emissions. The 88 sites account for 83 percent of the production of the entire Henkel Group.

Objectives of the product divisions

Chemical Products

Objectives



- Development of new raw materials on a purely vegetable basis → beginning with cosmetics raw materials
- Minimization of the consumption of energy and raw materials during manufacturing → starting with products for the cosmetics industry
- Development and active marketing of APEO-free emulsifiers for polymerization
Development of additives for environmentally more compatible paint systems
- Biodegradable distillates and cleansing oils for the printing ink industry

Status



- Permanent objective
- Cosmetic raw material, chitosan (see page 26)
- New products selling successfully on the market (see page 27)
- Worldwide roll-out
- Development work in progress

Surface Technologies

Objectives



- Group-wide auditing of environmental management by accredited external verifiers according to the European Union's Eco-Management and Audit Scheme and/or the international ISO 14001 standard
- Development and marketing of chrome-free conversion processes
- Development and marketing of environmentally more compatible pickling processes for stainless steel
- New objective: "engineered polymers"

Status



- Certification of the entire Henkel Surface Technologies organization within Germany to ISO 14001; certification of Mölndal site in Sweden to ISO 14001; other sites are preparing for certification
- Development of first products to the commercialization stage (see page 28)
- First products on the market (see page 29)
- Development work has already begun (see page 29)

Adhesives

Objectives

- Group-wide auditing of environmental management by accredited external verifiers on the basis of the European Union's Eco-Management and Audit Scheme and/or the international ISO 14001 standard
- Permanent revision and consistent optimization of the entire range of products
- Development of new emission-free or low-emission adhesives
- When choosing raw materials, preference given to renewable feedstocks

Status

Certification of Winsford site in Great Britain to ISO 14001

Permanent objective (see page 31 for product example)

First products successfully marketed (see page 30)

Permanent objective

Cosmetics/Toiletries

Objectives

- Use of renewable raw materials, preferably vegetable-based

Status

Permanent objective in the development of new formulations (see page 33 for product example)

Detergents/Household Cleansers

Objectives

- Use of eco-performance indicators for complete evaluation of the environmental impacts of detergents throughout their life cycle – definition of the indicators
- Reduction of 5% in energy consumption per wash cycle (relative to the 1996 level) by the end of 2001
- Reduction of 10% in the amount of detergent per wash cycle (relative to the 1996 level) by the end of 2001
- Reduction of 10% in the amount of packaging per wash cycle (relative to the 1996 level) by the end of 2001

Status

Indicators have been defined; final definition will be approved in 1999

Development work in the planned time schedule

Development work in the planned time schedule

Development work in the planned time schedule

Henkel-Ecolab

Objectives

- Long-term, group-wide certification of the environmental management systems by accredited external verifiers according to the ISO 14001 standard
- Reduction of wastewater pollution in customer plants in the food sector (breweries, dairies)

Status

Certification of Tessenderlo site in Belgium in 1999

Dispensing system successfully marketed (see page 37)

Product development of an enzyme-based cleanser completed (see page 37)

Site objectives

European region

		↓ Objectives	Result 1998 ↓	↓ Target year
Austria	Vienna	Certification to the EU Eco-Management and Audit Scheme		1999
Belgium	Herent	Reduction of 15 percent in water consumption	-10 percent	1998
France	Louviers	Creation of a wastewater register		1999
		Certification to ISO 14001		2000
	Meaux	Reduction of suspended solids in wastewater to less than 15 milligrams per liter by improved final sedimentation		2000
		Reduction of 10 percent in wastewater load by recovering recyclable materials (surfactants)		2000
	Nemours	Reduction of 10 percent in volume of waste	-1 percent	1998
	Ponthierry	Reduction of 60 percent in volume of waste	-34 percent	1998
	Reims	Reduction of 20 percent in water consumption (relative to 1998)		1999
		Certification to ISO 14001		1999
Germany	Düsseldorf-Flingern	20 percent less product residues from cleansing processes in wastewater		1999
	Düsseldorf-Holthausen*	Increase of 5 percent in recirculated steam condensate		2001
		Reduction of more than 50 kilograms per year in nickel load in wastewater		2001
		Reduction of reportable accidents to 5 per 1,000 employees		1999
	Hannover	Reduction of 55 percent in water consumption		1999
		Reduction of 5 percent in hazardous waste (relative to 1997)		1999
	Heidelberg*	Reduction of 30 metric tons in packaging material	-70 metric tons	1998
		Reduction of specific energy consumption from 320 to 290 kilowatt hours per metric ton of product		1999
	Herborn-Schönbach*	Reduction in water consumption and volume of wastewater by reducing the number of cleansing operations (installation of pipes that can be cleaned with pig systems)		2000
	Illertissen*	Reduction of COD load in wastewater (reference value 1998: 352 metric tons)		1999
	Loxstedt*	Certification to ISO 14001 and EU Eco-Management and Audit Scheme	Achieved	1998
		Reduction of 10 percent in hazardous waste (relative to 1998)		1999
	Magdeburg	Sealing of the catch pots in the depot for water-polluting substances		1999
	Siegburg*	Reduction of 5 percent in production waste	-1 percent	1998
		Reduction of 5 percent in water consumption		2000
Hungary	Körösladány	Certification to ISO 14001		1999
	Vác	Certification to ISO 14001		1999
Ireland	Ballyfermot	Certification to ISO 14001		1999
	Cork**	Reductions: 40 percent in sulfur dioxide emissions	Extended to 2000	1998
		25 percent in nitrogen oxide	Extended to 2000	1998
		25 percent in carbon dioxide	Extended to 2000	1998
	Tallaght	Certification to ISO 14001		1999
Italy	Ferentino	Reduction of 30 percent in water consumption	-34 percent	1998
		Reduction of 10 percent in volume of waste per metric ton of product		2001
	Lomazzo	Reduction of 50 percent in water consumption	-42 percent	1998
		Reduction of 10 percent in volume of waste per metric ton of product		2001

* Additional objectives are declared in the site's environmental statement (can be requested free of charge).

** Additional objectives are declared in the site's comprehensive environment program.

		↓ Objectives	Result 1998 ↓	↓ Target year	
Poland	Racibórz	Reductions: 45 percent in sulfur dioxide emissions	-59 percent	1998	
		45 percent in dust	-53 percent	1998	
		45 percent in soot	-56 percent	1998	
		20 percent in carbon dioxide emissions	-34 percent	1998	
		Reductions: 96 percent in sulfur dioxide emissions		1999	
		97 percent in dust		1999	
		99 percent in soot		1999	
		20 percent in carbon dioxide emissions		1999	
Slovenia	Maribor	Certification to ISO 14001		1999	
		Construction of a wastewater retention basin		1999	
		Installation of catch pots in raw materials depot		1999	
Spain	Barcelona, Zona-Franca**	Certification to ISO 14001	Achieved	1998	
		Reduction of 10 percent in water consumption per metric ton of product		1999	
	La Coruña	Certification to ISO 14001		2000	
	Malgrat	Certification to ISO 14001		2000	
	Montornés	Certification to ISO 14001		2000	
	San Adrián	Certification to ISO 14001		2000	
	Santa Perpétua	Certification to ISO 14001		2000	
	Seville/Alcalá de Guadaira	Certification to ISO 14001		2000	
	Sweden	Möndal	Reduction of 50 percent in organic load in wastewater (relative to 1998)		2000
	Turkey	Cayirova	Reduction of 30 percent in organic load	-29 percent	1998
Certification to ISO 14001			Extended to 1999	1998	
Izmir		Reductions: 8 percent in water consumption	-4.6 percent	1998	
		20 percent in the volume of wastewater	-12 percent	1998	
	25 percent in the organic load in wastewater	-49 percent	1998		
	12 percent in nitrogen oxide emissions	-16 percent	1998		

African region

		↓ Objectives	Result 1998 ↓	↓ Target year
South Africa	Chloorkop	Certification to ISO 14001		1999

Asia/Pacific region

		↓ Objectives	Result 1998 ↓	↓ Target year
China	Guilin	Creation of a wastewater register		1999
	Siping	Reduction of 8 percent in the volume of wastewater (relative to 1998)		1999
Malaysia	Telok Panglima Garang	Reduction of 70 percent in the sulfur dioxide emissions of the boiler house		1999

American region

		↓ Objectives	Result 1998 ↓	↓ Target year
Canada	Toronto	Installation and starting up of an odor control system		1999
USA	Gulph Mills, Pennsylvania	Certification of responsible care management by the U.S. Chemical Manufacturers Association		1999
	Charlotte, North Carolina	Reduction of 45 percent in toluene emissions		2000
	Cincinnati, Ohio	Reduction of 10% in the organic load in wastewater	-0.9 percent	1998
	Kankakee, Illinois	Reduction of 50 percent in emissions of volatile organic substances		2000
	Lock Haven, Pennsylvania	Reduction of 80 percent in emissions of volatile substances	-20 percent	1998
Mexico	Ecátepec de Morelos	Reduction of 25 percent in emissions of volatile organic substances		1999
		Certification to ISO 14001		1999
		Reduction of more than 80% in the organic load in wastewater (relative to 1998)		2000
Argentina	Avellaneda	Certification to ISO 14001		1999
Brazil	Jacarei**	Certification to ISO 14001	Achieved	1998
		Reduction of 5 percent in laboratory waste (relative to 1998)		1999
Chile	Santiago	Reduction in volume of wastewater (relative to 2,500 cubic meters in 1998)		1999

Group objective

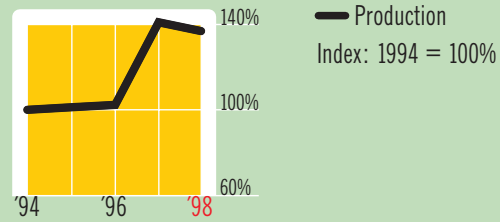
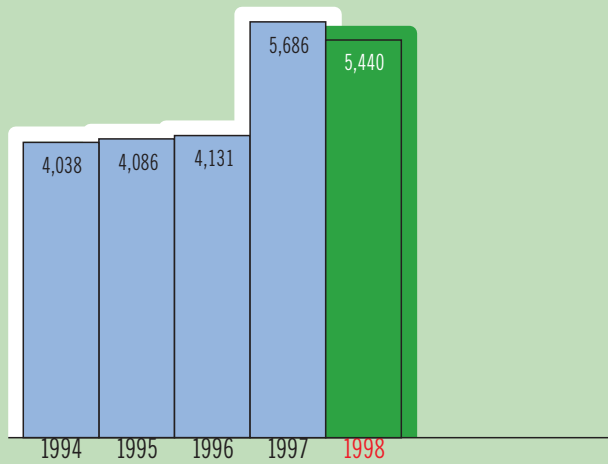
		↓ Objectives	Result 1998 ↓	↓ Target year
		Safety audits at 136 sites	107	2000

** Additional objectives are declared in the site's comprehensive environment program.

Environmental data

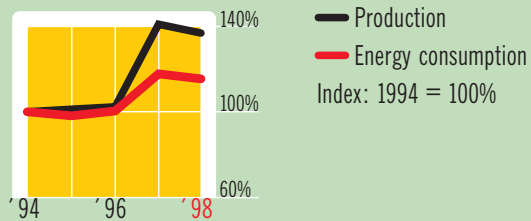
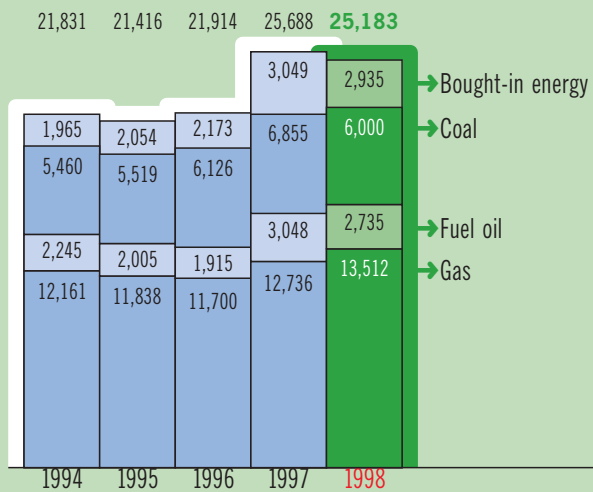
Production volumes

in thousand metric tons



Energy consumption

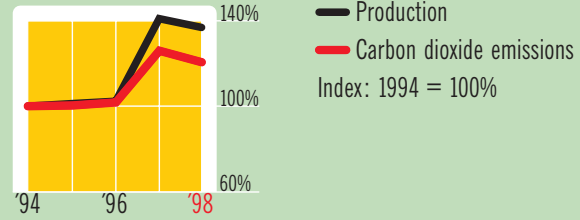
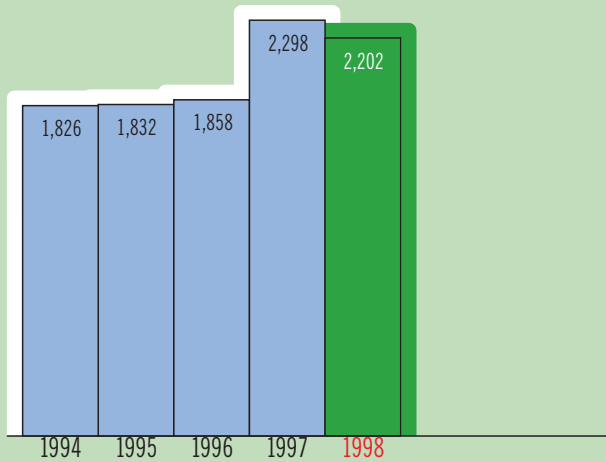
in terajoules



Bought-in energy is electricity, steam and district heating that is generated outside the sites.

Carbon dioxide emissions

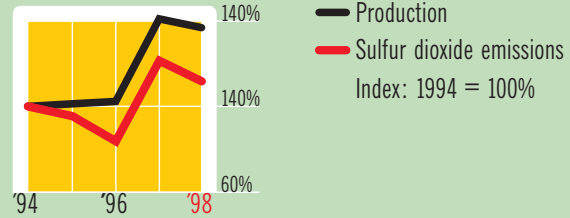
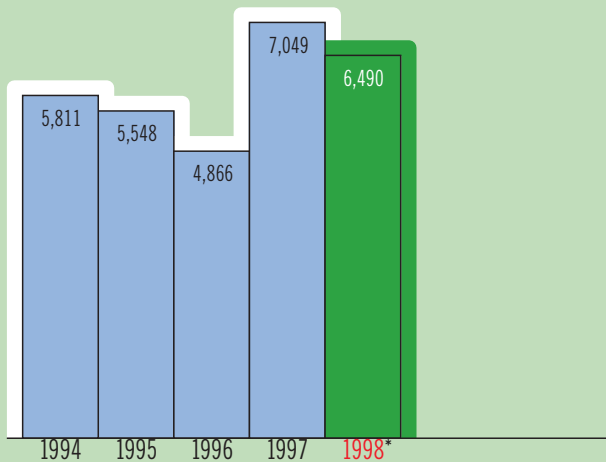
in thousand metric tons



The carbon dioxide released by the activities of the Henkel Group is almost all created by the generation of energy. The given values include carbon dioxide formed during the generation of bought-in, i.e., externally generated, energy. Since this carbon dioxide was not emitted at the Henkel sites, the amount was estimated with the help of recognized factors.

Sulfur dioxide emissions

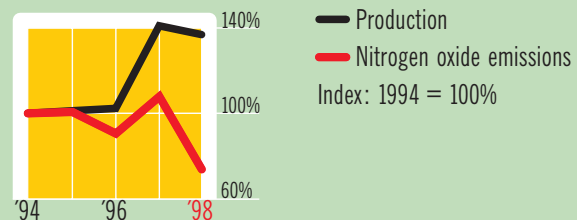
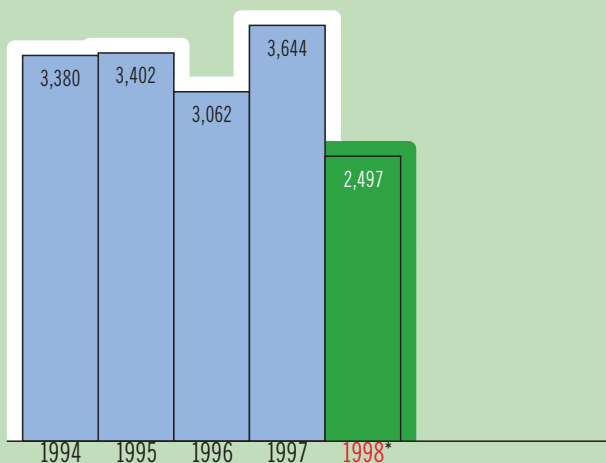
in metric tons



* Provisional value. At the time of going to press, not all data had been finally evaluated.

Nitrogen oxide emissions

in metric tons (calculated as nitrogen dioxide)

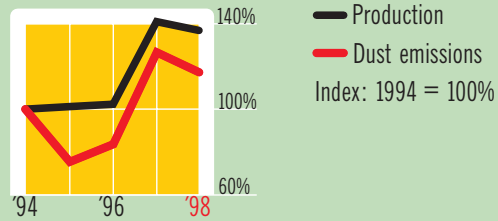
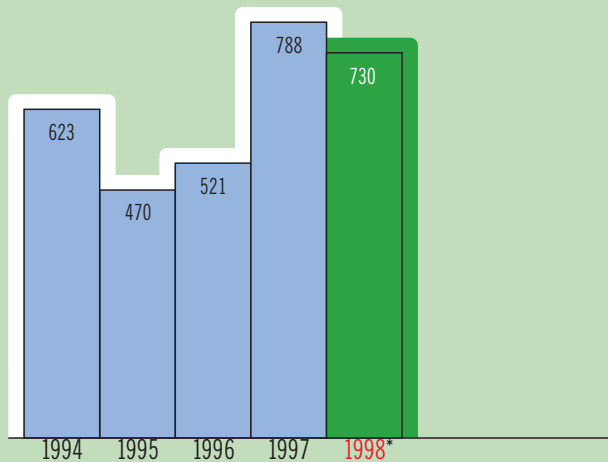


The reduction in nitrogen oxide emissions is largely attributable to the switch to different sources of energy at eastern European and Chinese sites.

* Provisional value. At the time of going to press, not all data had been finally evaluated.

Dust emissions

in metric tons

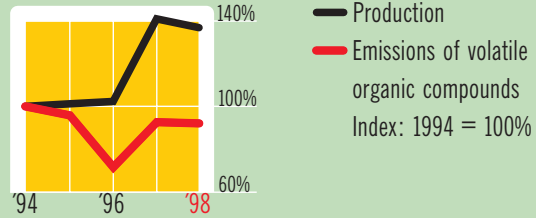
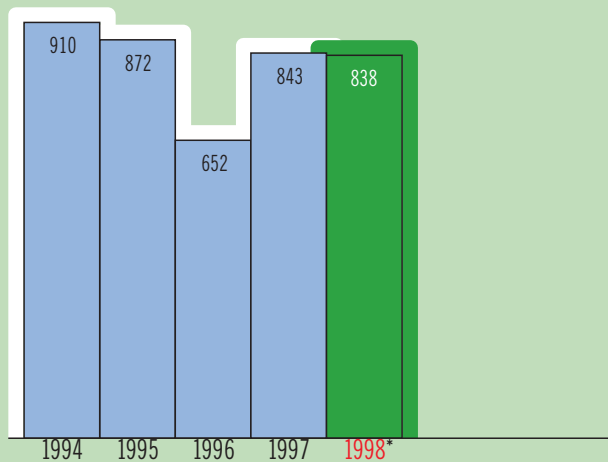


The values include aerosols, as they are difficult to distinguish from dust with the available measuring technology.

* Provisional value. At the time of going to press, not all data had been finally evaluated.

Emissions of volatile organic compounds

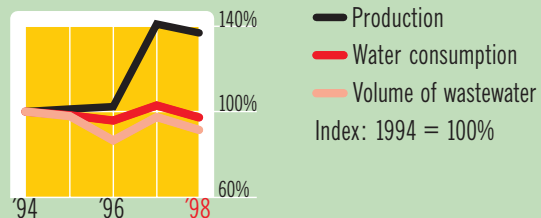
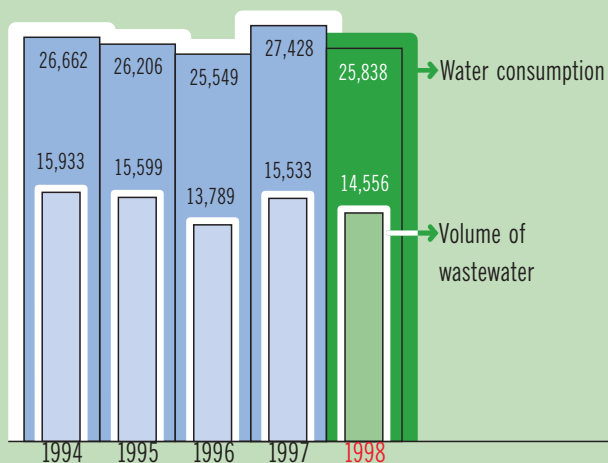
in metric tons



* Provisional value. At the time of going to press, not all data had been finally evaluated.

Water consumption and volume of wastewater

in thousand cubic meters



The water consumption includes all water, whether bought-in or extracted from Henkel's own sources. Most of this water is process water. Only a small proportion of drinking water is used.

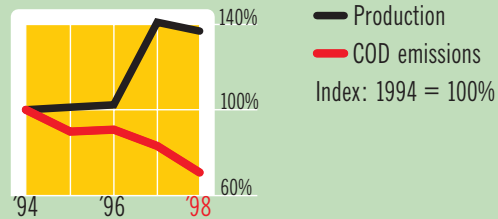
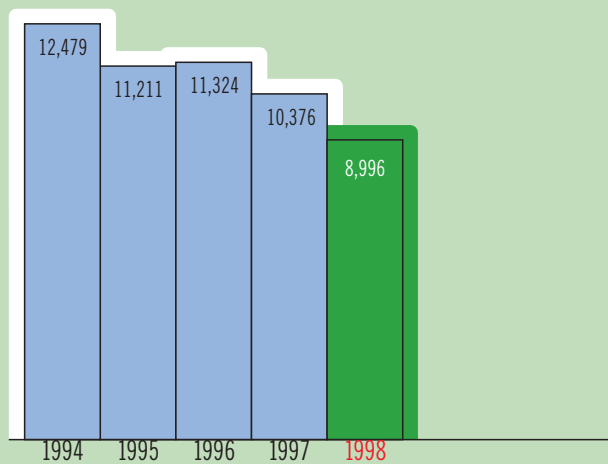
Because water is lost by evaporation from cooling towers and water is contained in products, the volume of wastewater is smaller than the volume of water consumed.

The significant aspect of wastewater emissions is the magnitude of the loads actually discharged into surface waters. Almost one quarter of the sites are direct dischargers. In other words, the site wastewater is treated in-house and is then discharged into surface waters (for example, a river or the sea). The wastewater loads of these sites can be added directly to the amount for the Henkel Group as a whole.

The other sites are indirect dischargers, and only a proportion of their wastewater loads therefore enters the environment. In order to reflect the actual burden on the environment in the total amount for the Henkel Group, it was assumed that, on average, 70 percent of the wastewater load from these indirect dischargers is degraded or eliminated in municipal or jointly operated sewage treatment plants. This is a very conservative estimate. Efficiently operated sewage treatment plants generally attain degradation and elimination rates well in excess of 90 percent.

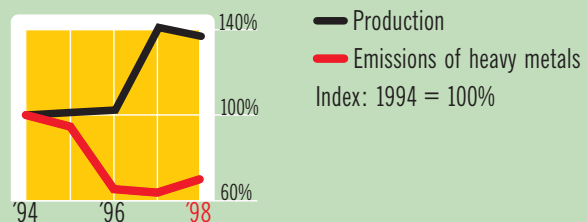
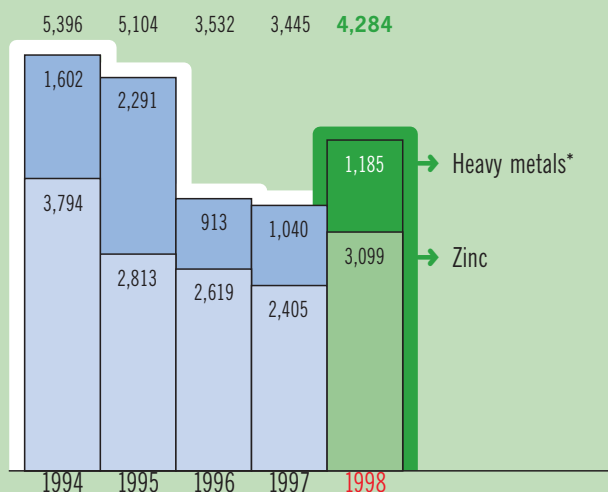
COD emissions into surface waters

in metric tons



Emissions of heavy metals into surface waters

in kilograms



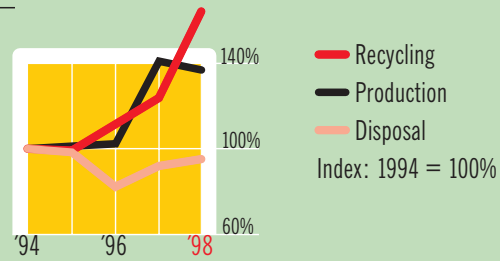
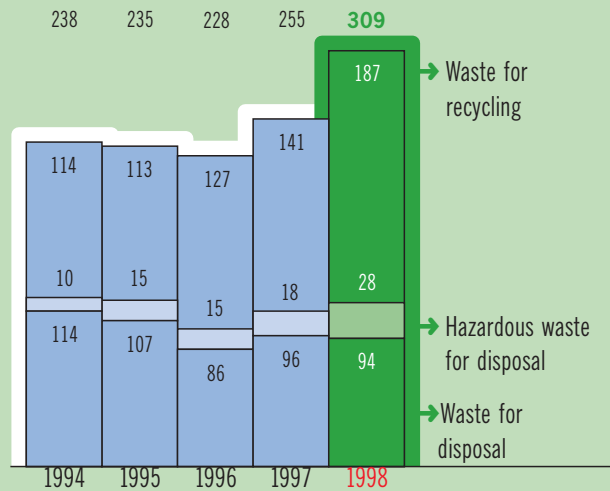
Heavy metals are partially eliminated in sewage treatment plants by adsorption on sewage sludge. Depending on its composition, the sewage sludge is either used as a fertilizer on agricultural land or is dried and incinerated. The ash left over after incineration is disposed of in landfills. Zinc is traditionally counted as a heavy metal. In terms of its effects on the environment, however, zinc is generally less harmful than the other heavy metals. In areas where there is a shortage of zinc in the soil, for instance, fertilization with sewage sludge that contains zinc may be beneficial. For this reason, the element zinc is shown separately.

The increase in zinc emissions was caused mainly by a change in production conditions at one site. Measures were swiftly taken in response, and zinc emissions at this site were back to their previous level by the end of 1998.

*Lead, chromium, copper, nickel; particularly hazardous heavy metals, such as mercury and cadmium, are not processed.

Waste for recycling and disposal

in thousand metric tons



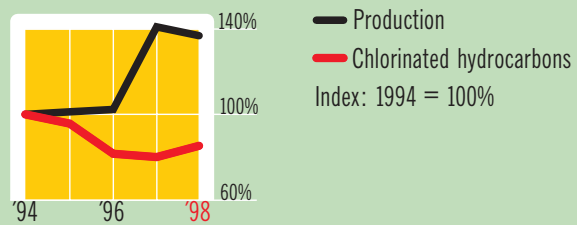
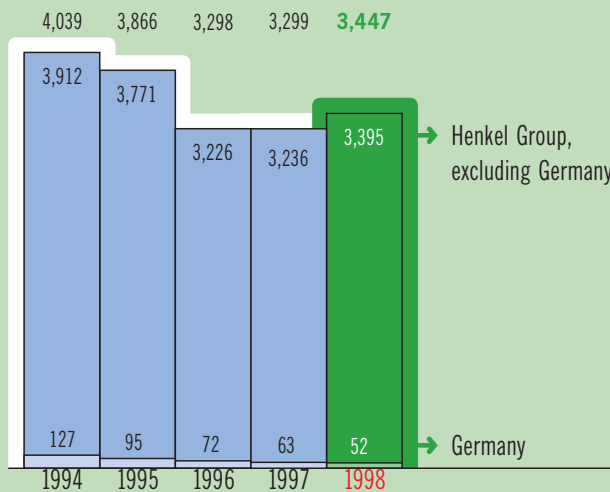
“Hazardous waste for disposal” includes not only those kinds of waste that are classified as hazardous under the laws of the respective countries, but also all hazardous wastes listed in the Basel Convention of 1989.

Because individual countries continue to extend their list of hazardous wastes, it is possible for the volume of hazardous waste to increase without any change having occurred in the waste situation in the Henkel Group.

The increase in the volume of waste for recycling in 1998 is attributable to just one site. Under the official requirements, as of 1998, waste recycled inside the site has to be included in the figures.

Consumption of chlorinated hydrocarbons

in metric tons



Methylene chloride, which is used in Great Britain in paint strippers, accounts for most of Henkel's consumption of chlorinated hydrocarbons.

A Alkylphenol ethoxylate (APEO)

Group of nonionic surfactants made from petrochemical base materials.

B Basel Convention

International treaty, concluded in 1989, which regulates the cross-border transport of hazardous waste. The Basel Convention includes a list of those types of waste that are, by agreement, classified as hazardous.

Business Charter for Sustainable Development

Charter agreed at WICEM II (Second World Industry Conference of Environmental Management) in Rotterdam in April 1991. It formulates principles of environmental management. WICEM II was organized by the International Chamber of Commerce (ICC) in cooperation with the United Nations Environment Program (UNEP) and the UN Conference on the Environment and Development (UNCED).

C Chemical Oxygen Demand (COD)

Measure of the total pollution of wastewater by organic substances. The COD value is the amount of oxygen needed to effect the chemical degradation of these substances.

Chlorinated hydrocarbons

Organic solvents that contain chlorine. Their technical superiority is offset by environmental and health disadvantages. Chlorinated hydrocarbons are thus increasingly being replaced by environmentally more compatible chlorine-free substances.

E Eco-Management and Audit Scheme (EMAS)

In 1993, the Council of Ministers of the then European Community (EC) adopted regulation 1836/93 “allowing voluntary participation by companies in the industrial sector in a Community eco-management and audit scheme.” Eco-management systems are certified by accredited external verifiers. A certificate always applies to an individual site.

I ISO 9001

International standard that describes a universal, comprehensive quality management system covering all stages of a product's life, from its development, through materials purchasing and production, to shipping to the customer.

ISO 14001

Internationally valid standard for environmental management at organizations and their sites. Certification is carried out by accredited external verifiers.

P Pig-compatible pipelines

Pipelines through which a “pig” can be sent. The pig is a special plug that separates the products pumped through the pipeline. It largely eliminates the need to rinse the pipelines when there is a change of product.

Product stewardship

The product-related aspect of Responsible Care. Product stewardship puts the product and its complete life cycle (raw materials, manufacture, packaging, transport, use, disposal) at the heart of all considerations of environmental and health aspects.

R Responsible Care®

A worldwide initiative developed by the chemical industry. It stands for commitment to continuous improvement in safety and the protection of health and the environment, independently of legal requirements. With this initiative, the chemical industry wants to set attainable objectives as a means of contributing to planning for an ecologically, economically and socially sustainable future. The trust and acceptance of the public must be gained by addressing people's concerns and fears. The chemical industry in more than 40 countries has joined the initiative. It is identified worldwide by the same logo. Responsible Care® is a registered trademark.



S SHE

Abbreviation for Safety, Health, Environment. In recent years, SHE has become a general term for the inclusion of safety and health in an expanded concept of environmental protection. In some countries, the sequence of the individual components is different, resulting in the abbreviations HSE and EHS.

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