

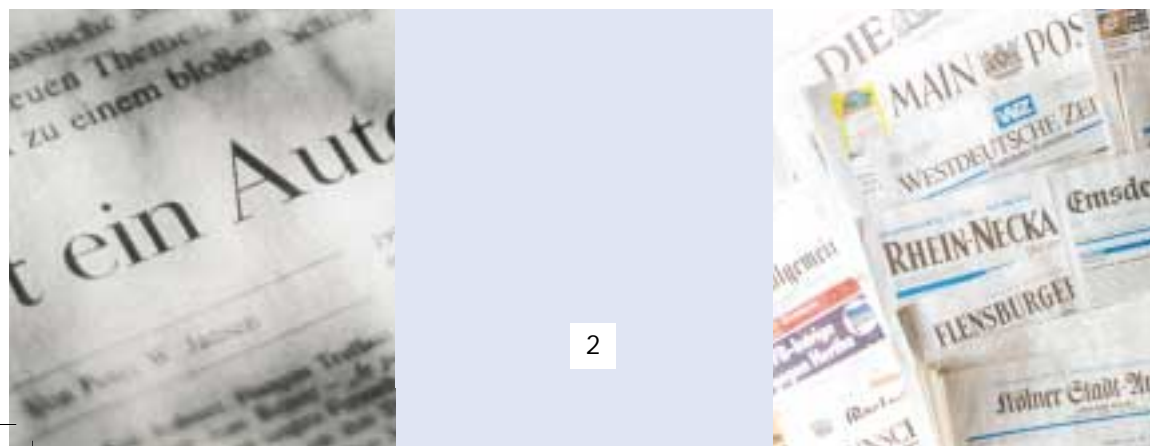


Printing products
and ecology





Objects and commitment of the German Pulp and Paper Association (VDP) and the European publication paper producers in Cepiprint, the Association of German Magazine Publishers (VDZ), the Federal Association of German Newspaper Publishers (BDZV), the German Printing and Media Industries Federation (bvdm) and the German Printing Ink Industry Association (VdD) on ecologically compatible production and recycling of printing products



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1 Preliminary remarks

For centuries, printed paper has been a conveyor of information, education and entertainment. In this way, printed products – i.e. books, magazines and newspapers – have formed a vehicle for the plurality of opinions and democracy.

Producing printed products based on ecologically unobjectionable raw materials and processes poses a major challenge for the publishing houses. In 1996 and 1997, "Printed Products and Ecology" principles were therefore elaborated and agreed by the Association of German Magazine Publishers (VDZ) and the producers of newsprint and magazine papers making up the German Pulp and Paper Association (VDP), together with the European manufacturers of such papers cooperating in CEPIPRINT. The present paper summarizes and updates these positions, together with those of the Federal Association of German Newspaper Publishers (BDZV).

Collaboration between all the partners involved in the production of printed products is an important prerequisite for innovatively coping with ecological, technical and economic challenges. Since the printing process and recycling are major factors in an overall ecological consideration of newspapers and magazines as products, the German Printing and Media Industries Federation (bvdm) and the German Printing Ink Industry Association (VdD) have also joined this statement with the points of relevance to them.

All the parties concerned accept their commitment to contribute towards optimizing the material cycle of graphic papers and to assure the product's ecological legitimization in every stage of its manufacture. The voluntary agreement concluded in 1994 between AGRAPA (Graphic Paper Working Group) and the German federal government to increase the material recycling of graphic recovered paper is just one example of the efforts made in this context.

2 – The positions



2.1 Forest management and harvesting

The Earth's forests are made up of a wide range of different types of forest. In addition to untouched forest areas, they also include natural, commercially used forests and plantations. They all are an essential part of our eco-system and of outstanding importance for the enduring sustainable economic, ecological and social development of humankind. This applies particularly to forests of great ecological value, the identification and protection of which are jointly promoted by industry and environmental organizations in the World Business Council for Sustainable Development (WBCSD) and others.

The producers of newsprint and magazine papers and the publishers are cooperating in order to ensure that wood from forest areas requiring protection is not used to manufacture their products. All parties concerned believe that these forests can only be sustainably protected if the protected areas are defined with due consideration of all economic, ecological and social interests.

The international process of certifying sustainable forest use which is already under way will lead towards this goal on a global scale, but only in the long term. Immediate action is therefore also necessary to protect primeval forests and those forests which are of particular ecological value.

2.1.1 Action

a) Forest certification

The partners have demanded the certification of sustainable forest management so that the sustainability of forest use can be convincingly promoted. The following requirements have been defined in this context:

- **Commitment to sustainable development**

The commitment to sustainable development is an essential prerequisite for forest certification.

- **Acceptance among social interest groups**

The economic, ecological and social interest groups concerned must be involved when defining ecological quality objectives, standards and guidelines.

- **Voluntary nature**

Certification is a voluntary process for all market partners and is based on the active implementation of an option for the forest user.



- **Control by independent third parties**

As with other quality marks, compliance with the agreed ecological quality objectives is verified by acknowledged expert organizations.

- **Transparency**

Basic principles, criteria and processes must be easily reproducible for outsiders.

- **Certification level**

Cost-efficiency and trace ability – depending on the size of the operation – must be pragmatically interlinked by models for individual and group certification.

- **International integration, applicability and comparability**

Regional and national models are an important first step. In the medium term, however, wood – as a globally harvested raw material – also requires a globally applicable framework for demonstrating the comparability of its ecological quality.

Different certification systems are being operated or established around the world today. Publishers and the manufacturers of newsprint and magazine papers support the mutual recognition of systems meeting these requirements.

b) Non-certified forest management

The partners emphatically support initiatives to introduce certification based on the above requirements in areas which are not yet protected or used in accordance with such criteria.

Management systems with integrated criteria for forest management and utilization plans carefully balancing ecological, economic and social interests can prove useful on the road to certification.

c) Protection of primeval forests

Ancient forests and old forests resembling primeval forests play an important role in the protection of biodiversity. They must be identified and precisely mapped, possibly with the aid of remote sensing, and each site specifically defined on the basis of available forest science methods. The partners support rapid identification of these areas. They promote regional coordination processes between the economic, ecological and social interest groups to establish the protection required in each case.

d) Conservation areas

The partners guarantee that no wood from conservation areas may be used for their products, unless the use of wood from storm damage or infested wood, for example, is provided for by a specific conservation programme.

2.1.2 Transparency

To make the value chain for forest products more transparent, the partners have developed models for tracing the material flows back to their point of origin. Among other things, these include effective management systems and verification mechanisms designed to ensure compliance with the protective agreements in force. These instruments are applied in practice and constantly developed further with verification and optimization of their efficacy. The papermakers support the introduction of such instruments when they become active in economic areas in which these instruments do not yet exist.

2.1.3 Monitoring

The partners will draw up and publish a joint annual statement of ongoing activities concerning forest management and harvesting.

2.2 Pulp production



Chemical pulp is indispensable for the production of high-quality newsprint and magazine papers, for which customers impose special demands with regard to whiteness and strength. It is made from wood, and coniferous trees, such as pine and spruce, are used to make softwood sulphate pulp.

To maintain and strengthen society's acceptance of paper as a printed medium, it is vital that the raw material should come from environmentally sound sources and that the production processes should be clean. For many years, companies in the pulp industry have invested considerable funds to optimize their processes and minimize the environmental impact. Publishers and papermakers undertake to give preference to pulp manufacturers who in turn undertake to subject their internal environment protection measures to continuous scrutiny and to improve them beyond the already strict statutory requirements.

2.2.1 Production process



The digestion of wood in the production of pulp is a chemical process. Pulp production follows the idea of a closed-loop material cycle with the relevant chemicals and raw materials being used to optimum effect and in a way that protects the environment (and makes efficient use of resources). The production process consists of debarking, comminuting, cooking, bleaching, washing and drying.

2.2.2 Energy

Pulp mills have a positive energy balance, i.e. more energy is produced than consumed. This is achieved by converting the by-products (waste liquor, bark, etc.) into energy and by saving energy through the principle of combined heat and power generation. To a limited extent, fossil fuels must also be used for reasons associated with the process engineering.

2.2.3 Pulp bleaching

The paper quality required for magazines and catalogues calls for pulp of high whiteness. The dark lignin remaining after the chemical pulping process must be removed through bleaching.

Elemental chlorine is the most efficient bleaching agent. In the 1980s, however, it was found that bleaching with elemental chlorine can have harmful effects on the environment. As a result of these findings, elemental chlorine was increasingly phased out and pulp bleached with elemental chlorine has not been used in Europe for the production of magazine papers since the early 1990s. The pulping process has been modified, and oxygen and its compounds are now used for the first bleaching stages. Whenever chlorine dioxide is used in the subsequent stages, the pulp is called ECF pulp (ECF = elemental chlorine-free). It is referred to as TCF (totally chlorine-free) if bleaching takes place without chlorine or chlorine compounds. TCF bleaching involves oxygen and its compounds (ozone and hydrogen peroxide), among others.

So-called complexing agents are required when hydrogen peroxide is used as bleaching agent. These complexing agents

prevent the hydrogen peroxide from disintegrating during the bleaching process. However, they are not readily biodegradable and are therefore used very sparingly. Where possible, they are only used in process stages in which the effluent is evaporated and the residues incinerated. The chemical suppliers are working on the development of new complexing agents which have a similar effect, but are based on easily biodegradable or readily eliminated natural compounds.

Publishers and the producers of newspaper and magazine papers give preference to paper made from chemical pulp with minimum environmental impact.

2.2.4 Water management

Water is used in pulp production to make cooking and bleaching liquors, and to wash the pulp. It is usually taken from rivers and lakes as surface water. In the last two decades, water consumption has been cut by well over 50 percent (1980 = 200 l/kg; 1999 = 60 l/kg). As with all other input materials, the primary objective of the pulp mills is to minimize the volume of process water and effluent as quickly as possible in or-

der to use this resource as efficiently as possible. The goal is to obtain closed water cycles and minimize the overall environmental impact.

Chemical residues and dissolved organic wood substances are carefully removed from the resulting effluent. The effluent sludge produced at each of the various stages is mechanically dehydrated and then primarily converted into energy, together with the bark from the debarking stage. Some of the sludge is also recycled into material for the construction industry and other uses or dumped in landfills. The aim is to further reduce the proportion of harmful substances in the effluent through further development and improved coordination of the pulping process and bleaching of the chemical pulp.



2.2.5 Exhaust air

The production of chemical pulp also liberates sulphur compounds which can cause a nuisance primarily on account of their unpleasant smell. These odours and the environmental impact, as well as the chemical input, are minimized by purifying the exhaust air and recovering the chemicals used. The emission of SO₂ has been reduced by more than 90 percent in recent decades. The aim of thermal conversion of the waste liquor is similarly to keep the overall environmental impact as low as possible.

2.3 Paper production

2.3.1 Optimization of the raw material input

Sparing use of raw materials – including the renewable raw material wood – has top priority in paper production. Economics and ecology are in harmony here, for raw materials and energy are the biggest cost items in the paper industry. Papermakers are working together with research institutes on ways to further increase the yield of fibrous material and to ensure responsible water and energy management.

Wood is used in the manufacture of paper as chemical pulp, mechanical pulp and as recovered paper. The paper used for printing products must have certain

properties which are defined by customers and the paper industry. Their requirements as regards strength, whiteness, coloring, opacity, etc. determine both the fibrous materials used and the fillers and additives.

With regard to the various raw materials used:

• **Chemical pulp input**

Chemical pulp enters the production process directly as finished input material in an integrated production system or from outside as supplied material.

• **Mechanical pulp production**



Mechanical pulp is wood which has been mechanically defibrated. The resultant fibres are bleached in a chlorine-free process. Mechanical pulp is usually produced directly in the paper mills.

• **Recovered paper preparation**



So that recovered paper can be used to make new printing paper, the printing ink must first be removed. In addition to water and air, soap, sodium hydroxide solution, sodium silicate, hydrogen peroxide and complexing agents are used as auxiliaries for this purpose. For the production of magazine papers, the fibrous material must be bleached in a totally chlorine-free process.

• **Fillers**



The fillers used in paper and for the coating include such natural sub-



stances as alumina, chalk, talc or precipitated calcium carbonate (PCC). They enhance the whiteness of the paper and its opacity, and improve the printability of graphic papers. Once again, the object is to optimize the input of raw material.

2.3.2 Paper production

Fibres, additives and fillers are brought together on the paper machine and turned into paper with the help of water and energy. Process and product must constantly be optimized with due regard for their environmental impact. The following goals are pursued in the various areas:

• **Water**

When producing newsprint and magazine papers, water is needed both to prepare the fibrous raw materials and in the actual papermaking process on the paper machine. It is usually taken from rivers and lakes as surface water and subsequently returned after it has been biologically purified. Water consumption today is a mere fraction of the quantities required in earlier times. The aim of the paper mills is to further optimize the use of water and ensure efficient use of this resource. As a result, average water consumption by the German paper industry has been reduced by 80 percent since the 1950s (1980= 27 l/kg; 2000= 12 l/kg).

- Energy

Most paper mills have their own power plants to generate electricity and steam. Steam is needed to dry the wet paper web. The energy generated in the paper mills themselves is often produced according to the principle of combined heat and power generation. The paper industry undertakes to continue its efforts in all areas to reduce the specific energy input and CO₂-output. By 1998, the specific energy input had been reduced to 2.9 MWh/t, as compared with 8.2 MWh/t in 1955.



- Additives

Starch, coating colours, binders, sizing agents, optical brighteners, wet strength agents, complexing agents and slimicides are additives used in papermaking to obtain different product qualities. To the best of our knowledge today, the environmental impact of these substances may be considered slight.

2.3.3 Emissions

- Effluent

The goal is to further reduce effluent volumes by improving closed-loop operations and process engineering, as well as by using suitable additives. The prime objective is to achieve a state of minimum impact. The effluent remaining after several cycles is carefully cleaned to remove suspended matter, residual chemicals and dissolved organic substances. The effluent sludge produced at each of the various stages is mechanically dehydrated and then primarily converted into energy, together with other residues and the bark from the debarking stage. Some of the sludge is also recycled into material for the construction industry and only to a minor extent dumped in landfills.

- Residues

Efficient raw materials management results in a steady reduction in waste volumes. Unavoidable residues are mainly recycled or converted into energy.

2.4 Printing

2.4.1 Printing process

Printers undertake to use raw materials and energy in a sustainable manner and to minimize the risks and impacts due to production. The effort must be economically, technically and socially acceptable in relation to the desired environmental relief.

As individual stages are optimized, the pollutant materials and additives are either reduced or replaced and the effluent, waste or exhaust air volumes diminished. In this way, the ecological quality of the printed products is continuously improved.

Publishers and printers agree to continue the effective promotion and further development of ecologically compatible methods for producing printed matter using gravure and offset printing processes.

Attention is drawn to section 2.6.1, second paragraph, with regard to the use of production materials and auxiliaries (particularly printing inks and glues), as well as printing techniques.



2.4.2 Preventive care and co-operation in the printing process

Production processes and the materials used are constantly reviewed to ensure their environmental compatibility. Protection of the environment is taken into account from the very outset when designing products and processes. To this end, the printers work closely together with the manufacturers of paper, printing inks and machines, as well as other suppliers.

2.4.3 Efficient use of resources in the printing process

The products required by the market determine the choice of paper grades used and these, in turn, determine the ink consumption and print quality. Printers and papermakers inform publishers and their customers in the printing industry of these interrelationships and advise them as regards the use of ecologically, economically and functionally appropriate papers. The print shops support the commitment of the paper chain to optimize the use of recovered graphic paper.

Sparing use of materials and energy is the prime objective in all production lines. In the print shop, the width of the paper web is defined with millimetre accuracy in order to minimize the offcut of the printed product. The solvents used in the gravure inks are recovered and re-used to produce new inks. The chemicals needed to produce the printing formes (gravure cylinders and offset plates) are recycled, thus reducing the input of water and chemicals. Consumption of fixing bath for film processing, for example, has been reduced by more than 50 percent by internally recycling the fixing bath. The copper and chromium baths used to produce gravure cylinders also have a very long service life and are then recycled.



2.4.4 Lower emissions from printing processes

Since the 1950s, the exhaust air produced when gravure-printing magazines has been purified in activated carbon systems and the solvent toluene, which is used in the printing inks, recovered for reuse as a raw material. Such measures as this toluene recovery, enclosed printing systems and improved extraction technology, have reduced emissions by more than 90 percent in the meantime. Actual emissions by the printing industry's plants are well below the current ceiling of 100 milligrams solvent per cubic metre of air specified in the German regulation "Technical Instruction Air" (TA-Luft). Efforts are under way to reduce the emissions from gravure printing of magazines still further.

Heatset offset lines, in which the printing ink is dried in heat, have for decades been equipped with afterburning systems which remove the mineral oil from the exhaust air from the driers. Work is also continuing to reduce the diffuse emissions associated with cleaning. The input of alcohol (isopropanol) as a printing auxiliary is similarly to be reduced with the aid of technical features in the machines and through the use of substitutes. All in all, solvent emissions from heatset offset printing are to be reduced by 50 percent.

The campaign for "Low-emission printing" initiated by the various associations of the printing industry supports the print shops when changing over to low-emission cleaning agents. The employers' liability insurance association for printers and paper processors has also launched a campaign with the same objective.



2.4.5 Reduction in waste and effluent from printing processes

Efficient use of resources in print shops also considerably reduces the resultant effluent and waste volumes. Optimized processes reduce the pollutant loads. Waste management can help to avoid wastes or ensure they are recycled and reused. The recovered paper accumulated during production is pre-sorted and directly returned to the papermaking process. Automatic ink mixing systems and systems for processing waste ink in which the inks are filtered to remove dirt particles can help to reduce the ink consumption. Contaminated solvents are filtered or distilled and reused. Reusable fabrics are primarily used for these cleaning operations. Printers are working to further reduce the effluent volumes from film and printing forme production processes.

Tests on water-based gravure printing inks have shown that such ink systems do not pose any alternative for magazine printing at present, since more energy is required to dry these inks than when using conventional ink systems and disposal of the resultant pollutants also poses problems. Above all, the inadequate print quality and productivity are further arguments against water-based gravure inks when considered from the point of view of an overall ecological balance.



2.5 Printing inks

As in other areas of manufacturing printed products, the ink manufacturers take due account of environmental aspects when selecting the raw materials for their products, in the production of the printing inks and in the treatment of their residues, as well as through the efficient and sparing use of raw materials. The member companies of the German Printing Ink Industry Association support the "Responsible Care" campaign of the German chemi-



icals industry.* As a result of this commitment, major progress has already been made and the environmental impact reduced in recent years.

Because they intend to employ additional possibilities for protecting the environment on the basis of new technological and scientific findings, the ink manufacturers and magazine publishers have agreed to draw up and approve additional new goals based on the successes already achieved in the field of environmental protection as well as to define viable new approaches and possible controls.

The guidelines of the "Responsible Care" campaign are available on request from the German Printing Ink Industry Association at the following address: Verband der Druckfarbenindustrie, Karlstraße 21, D-60329 Frankfurt.

2.5.1 Selection of input materials for printing inks

Printing inks are primarily made from colour pigments, various resins and polymers, different solvents and miscellaneous additives. The raw materials are selected according to criteria which are designed not only to meet technical and economic requirements, but above all to ensure that only environmentally compatible and physiologically safe substances and processes are used.

The agreement on a "Negative list of raw materials for printing inks and associated products" which was concluded as a voluntary commitment by all members of the German Printing Ink Industry Association in 1993 is one example of the ink manufacturers' action in this context. The list is updated continuously. It was also adopted as a voluntary commitment by all other European associations of printing ink manufacturers in 1996. As a result, the use of such toxic heavy metals as lead, mercury, cadmium, chromium (VI) and compounds of these substances, as well as PCB, CFCs and PCP has long since been discontinued; these substances are not used in printing inks anywhere.

Products based on renewable raw materials have traditionally been used with preference in the production of printing inks. All the ecological consequences – up to and including the question of de-inkability – are continuously investigated by the manufacturers. Economics, ecological acceptability, occupational safety and product quality are factors of equal importance.

2.5.2 Production and handling of printing inks

Dispersion, mixing and homogenization are the most important stages in the production of printing inks. It does not involve any chemical reactions, nor the synthesis of new substances.

As in the production process, top priority is also attached to protecting the environment when handling and transporting the printing inks using the very best technology and measures.

The prime objective in all production areas is to exclude environmental impacts from the outset or to avoid them wherever possible.



2.5.3 Printing products, printing inks and recycling

In addition to the quality and application properties demanded by the market, the ink manufacturers also undertake to include their recyclability and re-usability when developing the printing inks. For many years, the printing inks industry has cooperated closely with the paper industry in optimizing the removal of printing inks through deinking.

2.6. Closed-loop production

Recovered paper is an essential raw material for the paper industry and should not simply be dumped. Printing products are a significant source of raw material for the production of new graphic papers.

Material recycling and the use of recovered paper to manufacture printed products is only possible if primary fibres are continuously introduced into the recycling process. In countries with plentiful forest resources and low population density, paper is predominantly made from primary fibres. In countries with heavy paper consumption, the paper industry depends above all on recovered paper. In this way, the paper fibre obtained from wood is reused as often as possible and processed to form new paper products. Printed matter is thus an ideal vehicle for closed-loop recycling of paper and board and therefore a perfect example of sustainable management. To achieve this aim, the principle of free competition must also be applied to the recovered paper market.

2.6.1 Product responsibility / voluntary agreement

The paper industry recognizes the principle of product responsibility. In the 1994 voluntary agreement by AGRAPA (Graphic Paper Working Group), papermakers, importers, printers and publishers undertake to increase the material recycling of graphic papers to 60 percent by the year 2000. Thanks to exceptional investments totalling several billions in recycling capacities over the last few years, more than 80 percent of the used graphic papers are now recycled. This is practically the maximum possible with the currently available techniques.

Publishers, printers and papermakers undertake to use production materials and auxiliaries (particularly printing inks and glues), as well as printing methods which will not impair the recycling of recovered paper wherever technically possible and reasonable.

2.6.2 Collection and sorting of printed matter

The collection of recovered paper must be efficient and reasonable, and it must be based on the manner in which

the recovered paper is to be recycled. While graphic recovered paper can be used to produce packaging papers and board, it is impossible to produce graphic papers from recovered packaging.

Transport and sorting of mixed household recovered paper is expensive. The technological input and financial outlay required to sort paper can be considerably reduced if packaging paper is already separated from graphic paper in the household. One of the main targets set by AGRAPA is therefore to optimize the recovered paper collection systems. The needs of the users concerned must also be taken into account: a manufacturer of graphic papers depends on separate collection of graphic paper, while the manufacturer of packaging paper can use mixed recovered paper.

2.6.3 Processing and deinking of recovered paper

The production of new graphic papers from printed matter is one of the cornerstones of the recycling concept. All the parties involved in the cycle consequently undertake to optimize the recyclability of printing products.

So that graphic recovered paper can be



used for new newsprint and magazine papers, the printing ink must be removed from the recovered paper (i.e. it must be deinked). Modern deinking processes require little energy and use eco-friendly auxiliaries. The residues from the recycling process are also used for other industrial purposes. In ecological terms, the products made by the paper and publishing industry are therefore exemplary.

The flotation process is the most efficient and technically most sophisticated deinking process. It not only recovers fibers and fillers which can be reused in graphic papers, but also eliminates from the production process those recovered paper constituents which cannot be used for papermaking. Promotion of industrial recycling of the residues resulting from the deinking process consequently plays a major role in the paper cycle.

The result of recycling recovered paper depends on numerous factors, such as the composition of the paper, the printing inks, sizes and ageing process. Papermakers, newspaper and magazine publishers, ink manufacturers and printers are called upon to ensure that their products can still be efficiently recycled following major changes in materials and processes. Practical tips can be found in the guide to optimum utilization of recovered graphic paper. This guide was jointly elaborated by the German Printing and Media Industries Federation (bvdm), the Adhesives Industry Association, INGEDE (International Research Association Deinking Technology), the German Pulp and Paper Association (VDP), the Association of German Magazine Publishers (VDZ) and the German Printing Ink Industry Association in 1998. (The latest version of the guide can be down-

loaded from the Internet at the following address:
<http://www.ingede.de/ingindx/Leitfaden/leitopti.html>).

The aforementioned guide to optimum utilization of recovered graphic paper also discusses the problems encountered in deinking industrially used, water-based printing inks and offset inks based on oil from renewable raw materials.

2.6.4 Energy recovery

The paper industry recommends that temporary surplus recovered paper be disposed of in the co-generating plants used within the industry itself for the conversion of other production residues. These systems operate on the principle of combined heat and power generation and are twice as efficient as plants devoted solely to power generation, for example.

2.6.5 Use of recycled paper

Publishing companies undertake to use recovered graphic paper where technically feasible and where acceptable in terms of quality and economy.

2.7 Transport

Although all parties make every effort to use the railways and waterways wherever possible for delivery of materials, as well as when shipping their printing products, road transport still remains the most important form of transport.

Tight schedules for inward and outward deliveries, as well as the lack of railway connections frequently make it impossible to transport goods by rail. Moreover, small product or material volumes often make it impossible to exert any influence on the means of transport used. In view of these restrictions, products and materials should be transported by any means reducing the emission of carbon dioxide.

3 – Research and development

3.1 Paper production

The paper industry is continuing its intensive efforts to further improve the ecological compatibility of the overall process through in-house and industry-wide research and development, as well as in cooperation with its customers, suppliers and science. Each and every innovative step is geared to the ultimate objective of minimum impact. In their projects, papermakers and publishers are guided by the goal of achieving and maintaining the ecological and social acceptance of the print medium paper.



3.2 Paper recycling

Research and development are concentrated in the International Research Association Deinking Technology (INGEDE), a collaboration of major European deinking papermakers. The papermakers undertake to further optimize the ecologically acceptable deinking processes.

3.3 Printing process

The member companies of the German Printing and Media Industries Federation intend to further improve the ecological compatibility of their printed

products and their production methods. To this end, they are promoting numerous research projects in this field, from machine technology through the materials used to recycling. They are working closely with the manufacturers of paper, printing inks and machines, as well as other suppliers, as demonstrated in several research projects.

3.4 Ink production

The ink manufacturers undertake continuously to review and update the reasonability and efficacy of their work and projects with regard to the state of the art and protection of the environment. This too is demonstrated in several research projects.

4 – Openess and dialogue

4.1 Papermakers and magazine publishers

Magazine publishers and the manufacturers of newsprint and magazine papers recognize the need for openness and dialogue on ecologically relevant aspects of papermaking. This is documented by the papermakers' and publishers' participation in eco-management and certification schemes.

In the meantime, eco-management systems to ISO 14001 or EMAS (Environmental Management and Audit Scheme) have been introduced by several of the companies involved. They are promoting this development and offering their assistance within the framework of an exchange of experiences.

4.2 Printers

Eco-management systems have already been introduced by the printing companies. The associations have also developed methods with which specific eco-ratios for illustration gravure printing and newspaper printing can be determined and observed over time.

4.3 Ink manufacturers

The ink manufacturers intend to, and will, expand the existing activities of the "Responsible Care" campaign and intensify them by launching new projects. In this context, the ink manufacturers are also working on the introduction and further development of eco-management systems as a means for consistently improving protection of the environment.

5 – Update and verification

All the parties concerned have agreed constantly to verify the present statements and commitments and to update them as required.

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