Arctic Paper S.A.

Arctic Paper S.A. is one of the leading European manufacturers of bulky book paper and graphic fine paper.

The Group produces high quality coated, uncoated wood-free and uncoated wood-containing papers. The Group’s product portfolio includes the brands such as Amber, Arctic, G-Print and Munken. Production takes place in Poland and Sweden.

The total annual production capacity of the Group’s three paper mills is about 695,000 tonnes. Arctic Paper Group currently employs 1400 people and sales offices are deployed in 15 European countries. Arctic Paper is listed in the Warsaw Stock Exchange as well as in NASDAQ OMX in Stockholm.

Arctic Paper in Europe

Arctic Paper Kostrzyn S.A.
Environmental Report 2017

List of contents

- preface ................................................................. 3
- mill facts .............................................................. 4
- environmental management .................................. 5
- environmental policy ............................................. 5
- paper production ................................................ 6
- local processes .................................................. 7
- summary of environmental data ............................ 9
- biodiversity ....................................................... 10
- significant environmental aspects ........................ 11
- core indicators .................................................... 12
- achievement of environmental targets in 2017 ........... 16
- environmental targets 2018 and action plan .............. 17
- environmental verifier’s statement ........................ 18
- contacts .............................................................. 18
- glossary ............................................................. 19

Arctic Paper Kostrzyn S.A. (APK S.A.) is the largest producer of offset paper in Poland and the second largest producer of graphic paper. Since 1993, the company has belonged to the Swedish paper industry group Arctic Paper.

The products of the Kostrzyn’s mill are paper grades of Amber brand. These are the superior quality, uncoated woodfree papers, manufactured in the modern, safe and environment friendly conditions.

Arctic Paper Kostrzyn S.A. has been certified to quality management systems ISO 9001 and work safety systems PN/N 18001 and OHAS 18001. The Company has implemented the environmental management system ISO 14001 and publishes generally available EMAS report about its impacts on the environment.
I have the pleasure of handing over to you the EMAS Report, summarizing environmental actions taken by Arctic Paper Kostrzyn S.A. in 2017.

Year 2017 was the year when actions intended to mitigate the impact of paper production process on the natural environment were continued. We have been focusing on seeking methods for reduction of energy consumption in production processes and implementing them. This process have been commenced and will be a continuous process in the nearest periods. We have also started the process of reducing water consumption per tonne of production. The first visible effects of these activities should appear in 2018.

Arctic Paper Kostrzyn SA continuously takes actions that reduce an impact of its activity on the environment. It concerns both investments in the production process and the use of ecological raw materials. The mill holds FSC and PEFC certificates for Amber grades produced.

In this report, you will find a description of our environmental policy implementation; I encourage you to read the report.

Kostrzyn nad Odrą, 4 June 2018

Henryk Derejczyk
President of the Management Board
Brand: Amber Graphic, Amber Preprint, Amber Volume, Amber Highway

Production capacity: 306,000
Sales: Export 73%, Country 27%
Employment: 414

Energy
- Gas boilers: 169 MW
- Back pressure turbines: 18.7 MW
- Gas turbines: 21.8 MW

PM
- PM1: Width 5300, Basis weight 60-100 g/m², Speed 800 m/min, Capacity 140,000
- PM2: Width 5300, Basis weight 70-170 g/m², Speed 800 m/min, Capacity 166,000

Sheet cutters
- 5 pcs: Sheet width 40 – 160 cm, Sheet length 42 – 160 cm, Capacity 160,000 ton/year

Storage capacity: 16,000 ton

Certificates
- Environmental management system according to ISO 14001:2004: LRQA Certificate No.: 2021-04-30
- Environmental management system according to EMAS: GDK0003001/E
- Supply chain according to FSC: NC-COC-012351 2021-12-06
- Supply chain according to PEFC: NC-PEFC/COC-000022 2022-06-05
Environmental management

Awareness
In the modern history of mankind, the understanding of the interplay between people and the environment became marginalised at an early stage already. Natural resources were regarded as being infinite and the human impact as negligible. The problems focused on were primarily those that tangibly and directly affected health. To make possible a systematic approach, methods for environmental review were developed, thus laying the foundation for additional environmental management.

In 1661, John Evelyn published a pamphlet “Fumifugium, or, The Inconveniencie of the Aer and Smoak of London dissipated” which was the predecessor of the modern environmental reviews.

Subject matter
Environmental management can be defined as becoming aware of the environment in a structured way and gradually reducing one’s negative impact on the environment. EMAS and ISO 14001 are the specification documents that form the backbone of our environmental management systems. They are not only certificates of legal compliance, they also promote continuous improvement by means of routines, audits, objectives and programs.

Arctic Paper a pioneer
Today, there are many incentives behind the work on reducing the negative environmental impact and with its long-term commitment and well-established systems, Arctic Paper is a group with a clear focus on reducing environmental impact, increasing efficiency and an open dialogue.

Environmental policy

“Being solicitous for natural environment, we always choose long-lasting solutions.”

The goal of Arctic Paper Kostrzyn is mitigation of adverse impact of the mill processes on the environment.

Means to achieve goals:
1. Increasing personnel awareness concerning protection of the natural environment
2. Maximization of a share of certified raw materials
3. Optimization of water consumption
4. Reduction of energy consumption per production unit
5. Reduction of noise emission to the environment,
6. Preventing pollution and utilization of all solid wastes produced
7. Compliance with legal requirements regarding the environment protection.

Arctic Paper Kostrzyn meets legal standards and honestly informs about its activity impact on the environment. The environmental policy of Arctic Paper Kostrzyn is known to every employee and is available to all interested.

Henryk Derejczyk
President of the Management Board
Kostrzyn nad Odrą, April 5th, 2017
Pulp reception
The mill does not manufacture its own pulp; instead, it purchases it in the form of bales from external suppliers. After arrival at the mill, the pulp bales are stored in the pulp warehouse until needed. The pulp bales are slushed in process water, which has been purified internally, and then ground in refiners so that the fibres are softened and swell. Grinding is important for the paper’s strength properties. Various raw materials and chemicals such as filler chalk, adhesives and starch are added. The pulp is filtered in several steps to remove foreign particles.

Paper machine
Headbox and wire section
The function of the headbox is to distribute the diluted stock over the whole width of the wire. Dewatering and forming of the web take place in the wire section.

Press section
The web is dewatered still further in the press section. Here, the paper is given the right density and surface structure.

Surface treatment
After drying, the surface on both sides of the paper is treated in a sizing/coating process. The treatment gives the paper a smoother and stronger surface with improved printing properties. The surface is dried after the process in infra driers and in a second drying section of steam-heated cylinders.

Machine calendering and reeling
The web passes through a calender, which gives it its final surface structure. The finished web is reeled onto a tambour and moved to the winder.

Winder
In the winder, the large reel is divided into smaller rolls in line with the customer’s order. The different sizes of rolls are combined so that the width of the web is optimally utilised.

Finishing
Sheet cutters
The rolls are transferred to further conversion. In sheet cutters, they are cut into sheets in varying formats as requested by the customer. A part of produced sheets is packaged in an automatic ream packaging machine.

Pallet packing
Sheets loaded pallets are provided with a cardboard lid and shrink-wrapped.

Roll packing
Rolls to be delivered directly to the customer are fitted with protective packaging and labelled so that they can be identified.

Storage and shipping
The finished rolls and pallets with sheets are placed in the mill’s finished goods warehouse until they are released from inventory for transportation to the customer by road, rail or sea depending on the customer’s geographical location.
Energy production

1. The basic fuel for energy production is natural gas from local resources. The back-up fuel is light heating oil.

2. Gas parameters are continuously monitored before burning.

3. Generated heat is used for production of process steam necessary to dry a paper web.

4. Electric energy is generated by means of gas turbines and as the result of steam pressure reduction in two steam turbines.

5. Pollutants emission to the atmosphere is monitored in a half-year scheme.
Waste water treatment

1. The first stage of treatment consists in mechanical elimination of contaminants from waste water, which are generated in a paper production process (mostly pulp fibres and filler particles). This treatment takes place in two basins called sedimentation tanks, where contaminants are settling under gravity on a bottom and are removed, whereas pre-treated waste water passes further to be treated in next stages.

2. The second stage of waste water treatment occurs in two oxygen bioreactors. These are tanks where air is supplied. The “bio” prefix means that contaminants dissolved in waste water are subjected to degradation by micro-organisms.

3. At the third stage, treated effluents are separated in the sedimentation tank from products of bacteria activity and then are led to a flotation chamber, where after-treatment by means of air and chemicals takes place. Clean effluents are discharged to the Warta River.

4. Separated deposit from a mechanical and biological treatment plant is transferred, after being mixed and dewatered, to recycling (composting).
The raw materials, chemicals and energy required to manufacture 1 tonne of paper in 2017 (2016) are presented below. Also emissions to the air, discharges to water and volumes of waste generated during paper production are specified.

**Compliance with permit conditions**

<table>
<thead>
<tr>
<th>Production volume</th>
<th>Allowable value</th>
<th>Results 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>380 000 t/year</td>
<td>288 939 t/year</td>
<td></td>
</tr>
</tbody>
</table>

**Pollutants discharged to water**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Allowable value</th>
<th>Results 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>COD</td>
<td>1.5 kg/t</td>
<td>0.36 kg/t</td>
</tr>
<tr>
<td>SS</td>
<td>0.35 kg/t</td>
<td>0.07 kg/t</td>
</tr>
<tr>
<td>N total</td>
<td>0.1 kg/t</td>
<td>0.07 kg/t</td>
</tr>
<tr>
<td>P total</td>
<td>0.012 kg/t</td>
<td>0.004 kg/t</td>
</tr>
<tr>
<td>BOD5</td>
<td>0.07 kg/t</td>
<td>0.004 kg/t</td>
</tr>
</tbody>
</table>

**Emissions to the air**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Allowable value</th>
<th>Results 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dust</td>
<td>0.07 t/rok</td>
<td>0.7 t/rok</td>
</tr>
<tr>
<td>SO2</td>
<td>5.9 t/rok</td>
<td>187.9 t/rok</td>
</tr>
<tr>
<td>NO2</td>
<td>410.3 t/rok</td>
<td>142 783 t/rok</td>
</tr>
<tr>
<td>CO2</td>
<td>97395*</td>
<td>0.07 t/rok</td>
</tr>
</tbody>
</table>

**Other requirements**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Allowable value</th>
<th>Results 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise</td>
<td>42.3 dB(A)</td>
<td>42.3 dB(A)</td>
</tr>
<tr>
<td>Fresh water consumption</td>
<td>12 000 m³/24h</td>
<td>9 091 m³/24h</td>
</tr>
<tr>
<td>Waste water volume</td>
<td>11 000 m³/24h</td>
<td>8 245 m³/24h</td>
</tr>
<tr>
<td>Waste water temperature</td>
<td>35 °C</td>
<td>22-35 °C</td>
</tr>
</tbody>
</table>

We are meeting all other legal requirements applicable to operations of Arctic Paper Kostrzyn S.A.

* allocation of free CO2 emission allowance for 2017.
Presently, a significant environmental concern is reduction of forested areas on the Earth. This phenomenon brings about dangerous consequences. The following can be considered as the main ones: disturbance of water circulation in the ecosystem and increase of soil erosion; loss of livelihood by local societies and loss of biodiversity. The reason for such the situation is illegal trading in wild fauna and flora.

Since 2007, Arctic Paper Kostrzyn S.A. has been using exclusively a pulp produced from FSC or PEFC certified wood, which means that:

- the wood does not originate from an illegal source,
- the wood does not originate from areas endangered with extinction of species or having specific natural qualities,
- the wood does not originate from genetically modified trees,
- when wood harvesting, traditions and rights of local people are not violated.
Environmental aspects – components of Arctic Paper Kostrzyn activity, products and/or services – influencing the environment, have been identified based on a map of processes performed in the mill. For every unit process input data have been collected and output data defined, with a special attention paid to:

- emissions to the air,
- discharge to waters,
- waste handling,
- soil contamination,
- use of natural resources,
- other local environment and community related issues.

An aspect is considered to be significant, when at least one condition is fulfilled:

- a scale of environmental effects is large,
- it can be difficult to eliminate consequences,
- there can be a risk of exceeding limit values / emission standards.

The following have been considered as the most significant environmental aspects:

- Pulp consumption
- Water consumption
- Discharge of mill effluents
- Sludge
- Consumption of electricity and heat
- Possibility of chemicals and oils leakage
- Emission of carbon dioxide
- Noise emission.
- Possibility of gas explosion
- Fire
- The image of Arctic Paper Kostrzyn
core indicators

Net production
The relation to net production of paper is an important aspect when describing the progress of the company’s environmental performance. The net production shown in the diagram is used to calculate the efficiency of the operational activity with respect to the core indicators.

Material efficiency
The main raw materials used in paper production are pulp, filler, starch and auxiliary chemicals. Raw materials are transported to the mill by sea, road and rail. For key figures concerning raw materials, see p. 9.
Energy efficiency
The most energy-intensive processes in paper production are steam generation and operation of motors for paper machines, refiners and pumps. The steam is distributed to cylinders where a paper web is dried. The diagram shows the total energy consumption and the distribution between electric and thermal energy. Regarding key figures for energy consumption, see p. 9.

Waste water discharge
When manufacturing paper, water is used to slush the pulp into a fibre stock and to transport the fibres to the paper machine headbox. In the paper machine, the stock is dewatered when the paper is formed. Most of the water is utilised and recirculated in the mill. Water that is not recirculated goes to the mill’s waste water treatment plant. The amount of water used is measured as the waste water leaving the mill after having passed through the waste water treatment plant.

Waste
The diagram shows the mill’s waste quantity in relation to production volume. Whenever possible, the waste is recycled. Waste that is not suitable for recycling is used for energy recovery or disposed to a landfill site / treatment plant for destruction. Regarding waste related key figures, see p. 9. Energy recycling (co-combustion of dewatered sludge with coal) was ceased in 2005, once the coal-fired boiler house was eliminated.
emissions to the air

Sulphur dioxide (SO₂)
Sulphur dioxide is formed during the combustion of fuel containing sulphur, e.g. oil and coal. Sulphur dioxide contributes to the acidification of land and water.

Nitric oxides (NOₓ)
The umbrella term for the nitrogen oxides formed during combustion, potentially contributing to the acidification of land and water.

Carbon dioxide (CO₂) fossil
Carbon dioxide is formed during the complete combustion of carbon compounds in oxygen containing atmosphere. When fossil fuels are burnt, the carbon dioxide content in the atmosphere increases, because carbon thus added to the atmosphere has been outside the natural cycle for a very long time. The increased carbon dioxide content in the atmosphere is considered to be one of factors contributing to global warming. In the long-term, using renewable forms of energy, such as biofuel and hydroelectric power, does not increase the carbon dioxide content in the atmosphere.

* Starting from 2015, indicators have been related exclusively to energy consumed in our plant
emissions to water

**COD**<sub>cr</sub>
Chemical Oxygen Demand – a measure of the amount of organic compounds in water which consume oxygen during decomposition.

**BOD**<sub>5</sub>
Biological Oxygen Demand – a measure of the amount of oxygen consumed by microorganisms during the decomposition of organic substances in water over a period of five days.

**Suspended Solids (SS)**
Fibre fragments and other solid substances (e.g. filler) in waste water are called Suspended Solids; they cause cloudiness of water. Suspended solids interfere with light access to water which reduces aquatic vegetation growth.

**Nitrogen (N)**
The element that exists in large amounts in the atmosphere. High levels of nitrogen compounds can, together with phosphorus compounds and organic substances, result in enhanced organic activity in water, which, in turn, can result in watercourses becoming overgrown.

**Phosphorus (P)**
Phosphorus is the element. High levels of phosphorus compounds can, together with nitrogen compounds and organic substances, result in enhanced organic activity in water, which, in turn, can result in watercourses becoming overgrown.
Goal: Reduction of oil consumption on paper machines.
Assumed goals were not achieved.
Goal for PM1: <365 kg/month; the result achieved: 574 kg/month
Goal for PM2: <305 kg/month; the result achieved: 365 kg/month

Goal: Reduction of water losses.
As part of the project, sections of the fire water network from the Maintenance Warehouse area to the Paper Production Department area were replaced jointly with installation of a new hydrant, owing to which a potential risk of water loss has been reduced and fire safety improved in this area. The new section of the household sewage system from the Office Building No. 1 (together with the new waste water pumping station for this building) and the new pumping section from the PG-A main pumping station to the PS-1 pumping station were also started up, which is a preparatory stage of activities continuation intended to separate the combined sewer system in this area.

Goal: Reduction of electric energy consumption in the Paper Converting Department.
Light sources in the production hall were replaced. Fluorescent lamps 116W were replaced with 40W LED lamps.

Goal: Reduction of electric energy consumption in the pulp refining process
HW pulp refiners, PM1, have been replaced; presently a guarantee run is continued.
HW pulp refiners, PM2, have been installed and after successful test runs on PM1 will be switched into operation. Cost savings due to reduced electricity consumption are estimated to reach PLN 1.5 million per year.

Goal: Reduction of heat consumption
A new drying groups hood has been made and installed; as a part of PM1 Heat Recovery project, the following have been installed: two new heat exchangers 860 kW for white water and 2900 kW for fresh water; plate heat exchanger vapour/air, 752 kW, for heating the air directed to inter-ceiling space and two heaters – a glycol heater 868 kW and secondary steam heater 800 kW. Total power recovered directly from drying section vapours comes to 860+2900+572=4332kW. It should be noted that these are values for winter conditions. Yearly average values are about 1/3 lower. The glycol heater enables redirection of heat recovered from the turbo-exhaust unit to a new receiver, and the secondary steam heater allows the steam to be used for heating a medium with a higher temperature (previously it was condensed on a vacuum condenser).
environmental targets 2018 and action plan

Goal: Reduction of oil consumption on paper machines. Considering a failure in achieving assumed levels of oil consumption on paper machines, we have maintained goals at the same levels as in 2017:
For PM1: <365 kg/month;
For PM2: <305 kg/month

Goal: Reduction of water losses.
We are continuing the modernization of the fire water network – stage 6, as well as modernization of the combined sewer system.

Goal: Reduction of electric energy consumption in the pulp refining process
Project: Modernisation of HW refiners at PM1 and PM2 - continued.

Goal: Reduction of electric energy and water consumption
Project: Replacement of vacuum pumps on PM1 with Ecopumps.

Goal: Maintaining high efficiency of waste water treatment
Project: Modernisation of the aeration system on Bio-Treatment Plant.
TUVR NORD Polska Sp. z o. o., ul. Mickiewicza 29, 40–085 Katowice, with the environmental verifier registration number EMAS PL-V-0001, accredited for NACE 17.12 – “Production of woodfree graphic paper” – declares to have verified whether the whole organization as indicated in the updated environmental statement of 4 June 2018, Arctic Paper Kostrzyn S.A., ul. Fabryczna 1, 66-470 Kostrzyn nad Odrą, with registration number PL 2.08-001-13, meets all the requirements of Regulation (EC) No 1221/2009 of the European Parliament and of the Council, dated 25 November 2009, on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS).

By signing this declaration, I hereby declare that:

• the verification and validation have been carried out in full compliance with the requirements of Regulation (EC) No. 1221/2009;
• the outcome of the verification and validation confirms that there is no evidence of non-compliance with applicable legal requirements related to the environment;
• data and information of the environmental statement of the organisation reflect a reliable, credible and correct image of all organisation’s activities, within the scope as mentioned in the environmental statement.

This document is not equivalent to EMAS registration. Registration in EMAS can only be done by a competent body under Regulation (EC) No. 1221/2009. This document shall not be used as a stand-alone piece of public communication.

I declare that the verification of compliance with applicable requirements of Annexes I, II and III of Regulation (EC) 1221/2009 was based on the new content of the Appendices as defined by Regulation (EU) 2017/1505.

Done in Katowice, 11/06/2018
EMAS Environmental Auditor
Grzegorz Tuleja

For further information and ordering the environmental reports

Arctic Paper Kostrzyn S.A.
ul. Fabryczna 1, 66-470 Kostrzyn nad Odrą, Poland
Tel. +48 95 7210600, Fax +48 95 7524196
E-mail: info-kostrzyn@arcticpaper.com
www.arcticpaper.com

The Arctic Paper Kostrzyn Environmental Report is also available in Polish version both in printed and in digital form.

The next scheduled Environmental Report update is due to be published in spring 2019.

Contact persons for environmental issues

Mariusz Bartosiak
Management Systems
Tel. +48 95 7210782
e-mail: mariusz.bartosiak@arcticpaper.com

Jonas Dahlqvist
Group Environmental Coordinator
Tel. +46 524 17 1 83
e-mail: jonas.dahlqvist@arcticpaper.com

Product manager
Piotr Kowalski
Product Manager, Amber
Tel. +48 95 7210700
piotr.kowalski@arcticpaper.com

Environmental report 2017
ACCREDITED COMPANY
A company approved by an official authority to perform the defined analyses and audits of industrial processes.

BIOLOGICAL WASTE WATER TREATMENT
A method of waste water treatment by means of microorganisms used to decompose organic substances.

BLEACHING
The method of increasing brightness of, e.g. cellulose. Chemical agents not containing elementary chlorine, ECF or totally chlorine- and TCF-free can be used in the bleaching process.

BOD5
Oxygen required by microorganisms to decompose easily degradable organic compounds within 5 days.

CARBON DIOXIDE
CO₂. A naturally occurring gas produced through biodegradation as well as fuel combustion process.

CHEMICAL CELLULOSE
A common name for sulphate and sulfite cellulose, produced through chemical separation of wood fibres from each other.

MECHANICAL CELLULOSE
Mechanical cellulose is produced through mechanical separation of wood fibres from each other.

COD
The amount of oxygen required for a specific chemical decomposition of organic compounds present in water.

dB(A)
Decibel A, a method of sound intensity assessment, considering human sensitivity to different sound frequencies.

EMAS
Eco Management Audit Scheme (System Audytu i Zarządzania Ekologicznego). A scheme based on the EU regulation, involving the audited and publicly available annual environmental report.

EUTROPHICATION
PHOSPHOR, P, and NITROGEN, N, are the components of mineral salts promoting plankton growth in waters. Too high level of mineral salts can cause a rapid plankton growth, consuming all the available oxygen.

FINE PAPER
A general term used to describe graphic, writing and printing papers as well as some technical and special papers.

HAZARDOUS WASTE
The waste especially dangerous for the environment, such as some chemicals, oils, used batteries and electronic materials.

ISO 14001
The International Standard for environmental management. A certificate is issued following fulfilment of the requirements.

LIMIT VALUE
A specific value, defined and assigned by Environment Protection Authority, which cannot be exceeded.

NITROGEN DIOXIDE, NO₂
A gas formed from nitrogen during combustion process. Contributes to eutrophication.

RECIPIENT
Environmental component such as rivers, sea, lakes or atmosphere, receiving emissions and discharges.

OXGEN DEMANDING MATTER
Substances contained by the waste water discharged to a recipient, acting as fertilizers and reducing the amount of oxygen available for living organisms. Measured as COD and BOD₅.

SUSPENDED SOLIDS, SS
Smaller parts of fibres in waste water, visible with human eye, causing water opacity. Suspended solids prevent sunlight access to water, reducing growth of aquatic plants.

SULPHUR DIOXIDE, SO₂
A gas formed during combustion of sulphur containing fuels and causing acid rains.

UNCOATED PAPER
The paper coated with a thin layer of starch, as contrary to the coated paper, which is covered with a layer of filler, starch and synthetic binding agents.

FSC CERTIFIED RAW MATERIAL
A raw material with origin guarantee (Forest Stewardship Council), which excludes the wood produced without observance of five FSC rules (obtained illegally, with violation of common laws, from the forests of special values, protected areas, genetically modified or from the forests transformed into plantations).
For more information:
www.arcticpaper.com