



# JUNGFER, Germany



Jungfer Druckerei und Verlag GmGH is one of Europe's leading web offset printers. For over 60 years the company has been continuously improving its solutions by investing in its experienced staff and its exceptional technical facilities to deliver high quality printed products combined with tailored services.

The one-stop shop produces a broad range of print products and specialises in high volume advertising supplements. Its services include open workflow management, design and distribution of printed products, and links to digital media. Sustainability is a clear company goal and Jungfer demonstrate that there is no contradiction between economy and ecology, and that this tandem makes good business sense for them and their customers. Some examples of actions to improve their energy and material efficiency include:

- The renovation of the machine park has reduced production electricity consumption by 34% and air consumption by 25% from 1990 to 2008.
- Heat recovery of around 1000 kW of energy for hot water and heating reduces CO2-e emissions by 1600 tonnes a year.
- World's first computer controlled high volume ink supply system has eliminated waste ink residue.
- Alcohol-free printing and up to 80% of products printed on recycled paper since 2007.

Their most recent innovation is to improve total energy and emission efficiency of the process and factory with improved resource conservation by moving toward an almost CO2-e free printing process.

This began in 2008 when the company decided to purchase 2 new 80 page presses. The hot air dryers of their 5 existing presses were connected to a centralised oxidizer. However, the high gas consumption and lack of oxidizer capacity stimulated an innovative solution. The resulting 13 M € project combines a world first re-engineering of the energy supply with radical changes to heatset drying and related resource recovery.



## THE COMPANY (WWW.JUNGFER-GROUP.COM)

<b>Printing processes used at the site</b>	7 manroland heatset presses (3 x 80 pages, 1 x 48, 2 x 32, 1 x 16).
<b>Tonnage of substrate processed</b>	120 000 t/year paper / 4000 t/year ink.
<b>Tonnage of substrates held in stock</b>	3 000 t.
<b>Products</b>	Commercial products
<b>Number of staff</b>	300
<b>Environmental certifications</b>	None
<b>Carbon Footprint calculator</b>	Climate Partner



## THE SITE

<b>Location</b>	Herzberg, Harz Mountains, Germany.
<b>Climatic zone</b>	Continental.
<b>Installation zone</b>	Greenfield
<b>Existing risks (seismic, flooding) or specific environmental constraints</b>	None
<b>Year of construction</b>	1989 original building for 1 press, progressive additions, latest in 2012 for 7 presses.
<b>Total surface of the site</b>	45 000 m <sup>2</sup>
<b>Total surface of the building</b>	25 000 m <sup>2</sup>

# THE PARTICIPANTS

Director

Andy Wulf



Jungfer’s management team (from left) Guido Lang, Roger Melinghausen, Andy Wulf in front of the CHP turbine. Source: Jungfer.

## PROJECT

**Principal sustainable characteristics**

Improve total energy and emission efficiency of the printing process and the plant along with resource protection.

**Planning**

Two and a half years from decision to start-up.

**Cost of works (excluding investment in production)**

13 M €

**Direct and indirect impact on the production**

Heatset drying is now almost gas-free and makeready is faster and there are no negative impacts on press operation.

**Public or private financial aid**

None

How do you perceive the performance from the new building?

Function	Poor	Moderate	Good	Excellent
Better temperature humidity & dust conditions			X	
More stable production & storage conditions			X	
Improved productivity			X	
Reduced energy consumption & costs of building			X	
Image to customers				X
Flexible & future-proofed assets			X	
lower lifetime operating costs of building			X	
Overall sustainable environmental profile				X

What would you change if you started again?

- While Jungfer’s underling goal of a “complete CO2 free production” has not yet been fully met, they are largely satisfied with the economic and environmental results to date. The pilot heatset solvent recovery is work in progress
- Managing economic and environmental issues in tandem makes good business sense for the printer, their customers and stakeholders. We believe that the value of delivering competitive cost printing with an added optimum environmental profile will become progressively more important in the purchase decision of more and more customers. .

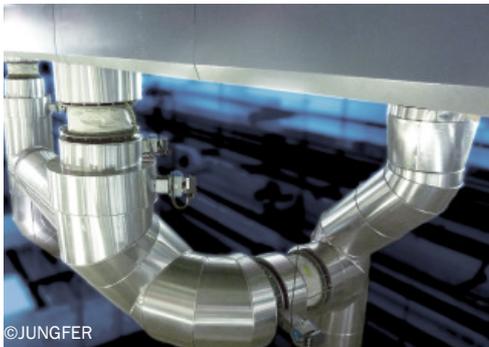


## PROJECT CONCEPTION/ SUSTAINABLE CONSTRUCTION

### Origin of construction/reorganisation



©JUNGFER  
CHP turbine generator



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Jungfer dryer ducts - Ducts feeding CHP hot air into the dryer have replaced gas energy.



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Jungfer recovery centre - Mineral oil recovery centre

Jungfer has an unusual press installation for Europe (although relatively common in North America) as its heatset press dryers are connected to a centralised oxidizer to incinerate mineral oils. In 2008, we decided to purchase 2 new 80 page presses. The 5 existing press dryers were connected to a centralised regenerative oxidiser that had no spare capacity, and this system also had a very high gas consumption. Therefore the company decided to pursue a more energy and resource efficient alternative for both the new and existing presses with an innovative 3-step concept:

**1- Electricity from CHP** (Combined Heat and Power). The gas turbine installed at the plant generates up to 4,6 kWh of electricity that is sufficient to supply the needs of the entire plant. (Gas is available from a nearby pipeline.) The CHP is run to provide a stable output of around 4,4 kWh and when demand fluctuates electricity can be either exported or imported from the German electricity grid. The CHP's energy efficiency is up to 95%, and its local electricity generation eliminates grid transmission losses. The gas fuelled system has around 60% less emissions than that of the nationwide grid's energy mix which reduces CO<sub>2</sub>-e emissions by 6000 tonnes/year. This system has proven to deliver excellent economic and environmental performance.

**2- Heat and steam is a CHP by-product.** The high steam volume can be used to generate chilled water, heat the factory, or even a swimming pool. However, Jungfer decided to primarily use this energy to evaporate ink solvents in the heatset dryer instead of using gas. The CHP generates around 7000 kW of hot air/steam at 375 °C which is more than enough for all the dryers. The steam is distributed through ducts. Gas is now only used at press start-up to more quickly heat up the dryer to operating temperature (steam + standard gas burners = rapid press start up). This heatset drying application is the first of its kind worldwide, its performance has exceeded the company's expectations and has largely eliminated dryer gas consumption and related CO<sub>2</sub>-e.

**3- Mineral oil condensation recovery.** This is another innovation for heatset web offset, although similar techniques are used in gravure. (Normally, the evaporated mineral oils from heatset inks are incinerated at 750 to 800 °C to comply with clean air exhaust requirements.) These inks contain about approx. 33% mineral oil, of which around 10% is retained in uncoated paper. The eventual goal of the system is to recover most of the remaining evaporated mineral oil through condensation to allow its recycling (rather than incineration). However, the target recovery level has not yet been attained and the residual output currently passes through oxidizers to ensure that clean air output requirements are met.

A second regenerative oxidizer has recently been installed that is mostly fuelled from some of the recovered mineral oil.

The system is now running and will be fully exploited when the last two presses are connected. Nevertheless, the system is described as an economic and environmental success. CHP is a very satisfactory technology to generate electricity and largely substitutes gas in the drying process. While solvent recovery is better than simply burning the mineral oil, there are outstanding economic questions as the current volume is not yet high enough to eliminate oxidizers, and the value of recovered oil fluctuates with crude oil price.