

**THE ENTIRE SPECTRUM
FOR CURING**



The Höhle Group's headquarters in Gilching, near Munich.

HÖNLE BUSINESS UNIT CURING – PARTNERS OF THE PRINTING INDUSTRY

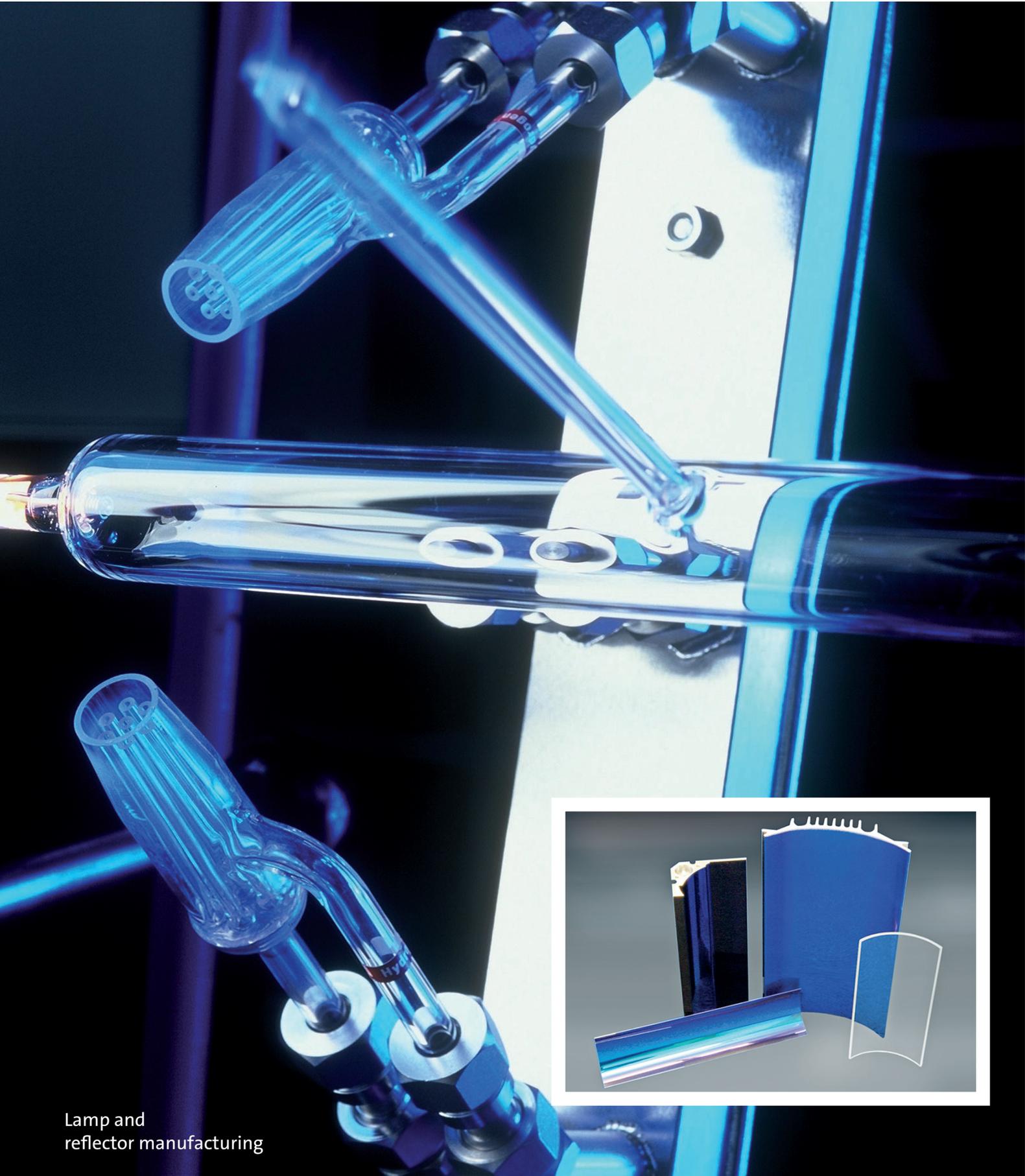
Real high-end products are created through the combination of expertise, exceptional engineering, and first-class components. The Business Unit Curing of the Hönle Group offers all of this. It brings together specialists to offer you solutions for curing and drying of inks and varnishes in the printing and coating industry using UV, LED-UV, UV inert, as well as infrared and hot air technology. Other special solutions such as excimer UV are realized in close cooperation with partners.

The Business Unit Curing consists of the entities Hönle, Eltosch Grafix, PrintConcept, and GEPA Coating Solutions and has been developing and manufacturing high-end curing and drying systems for the printing industry for decades—always up to date with the latest technology, in the highest quality, "Made in Germany," and fully customized to client needs.

Through our uniquely close collaboration with customers, as well as with raw material manufacturers and formulators of paints and coatings, we understand the market's needs and desires in detail. Forward-looking development projects lead to high-performance products and innovations for existing, as well as new application fields. This makes us true partners of the printing industry and trendsetters in curing and drying technologies.

We offer you the world's largest portfolio of UV, LED-UV, and IR/hot-air drying systems, as well as peripheral solutions around the printing process — and you benefit directly from our huge experience in developing individual, application-specific system solutions.





Lamp and reflector manufacturing

FROM CONCEPT TO IMPLEMENTATION – AND FAR BEYOND

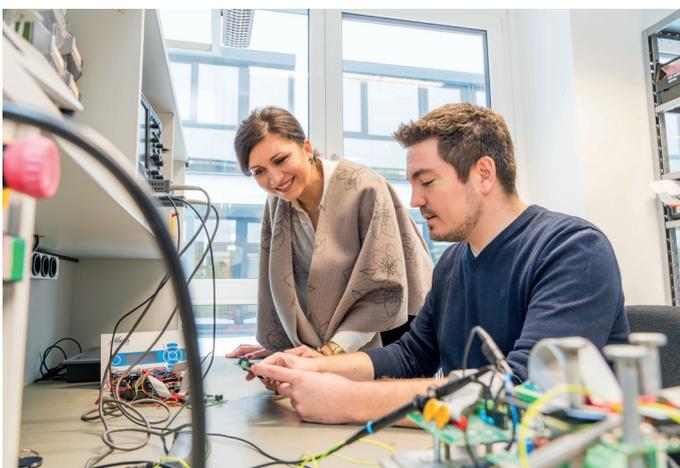
We listen because each application and process presents unique challenges.

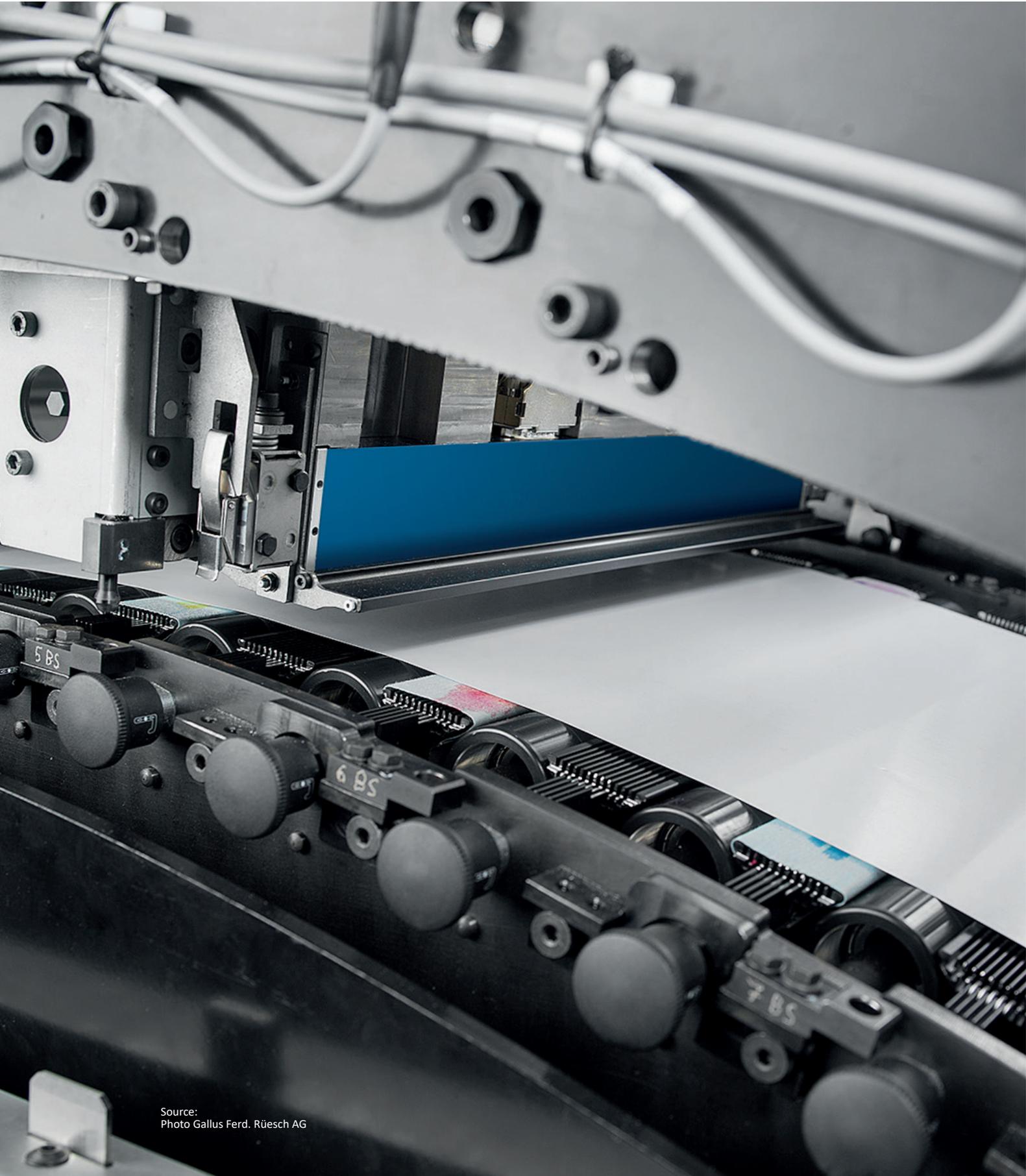
We understand our customers and translate their needs into top-notch products, thanks to our high competence and expertise.

We develop and manufacture the best solution, also due to our unique depth of production, particularly for the

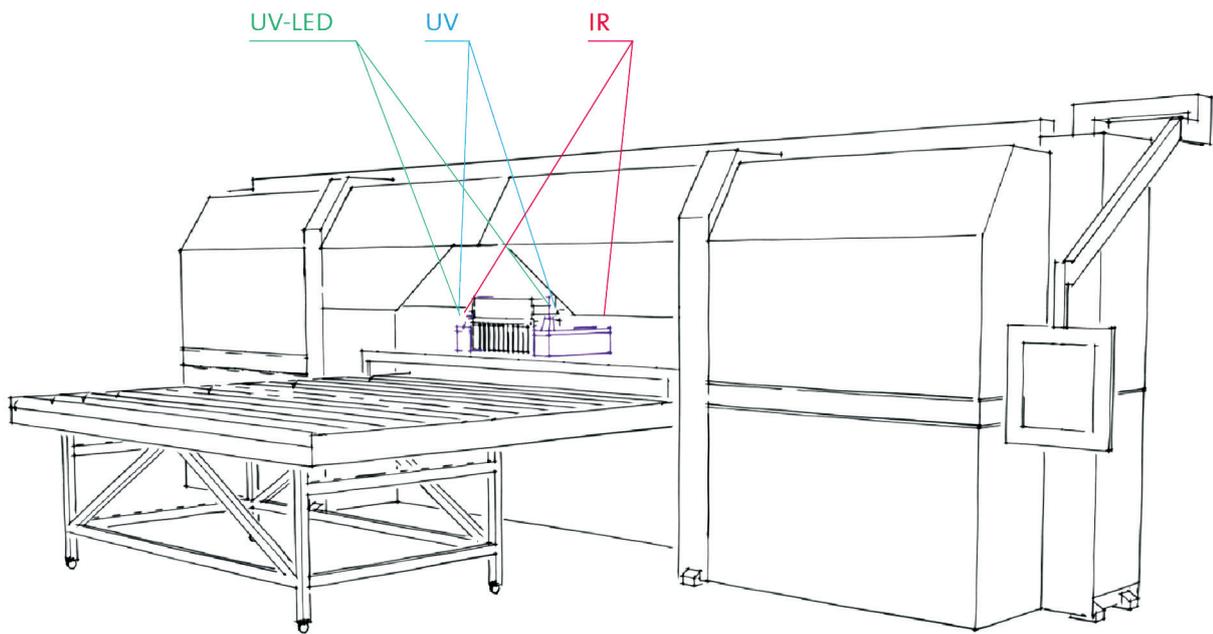
key components of our drying systems: From UV lamps and reflectors to our own LED assembly, from electronic power supply units to control cabinets, we manufacture everything in-house, and that differentiates us from others. This provides our customers with maximum flexibility and the highest quality standard.

We create innovation and value — for your application, your process, people, and the environment.





Source:
Photo Gallus Ferd. Ruesch AG



SOLUTIONS FOR DIGITAL AND INKJET PRINTING

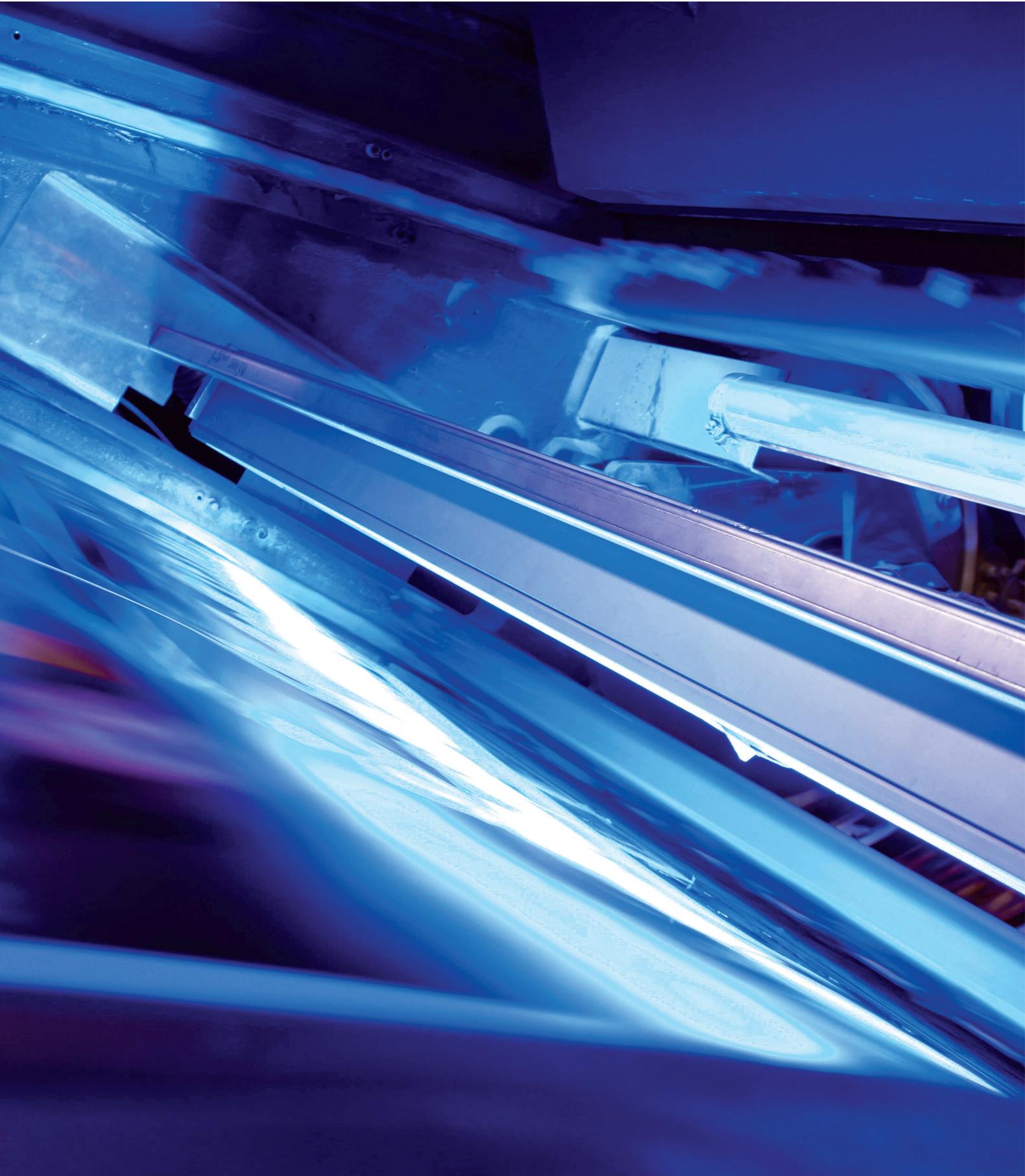
In digital printing, data is transferred directly from the computer to the printing machine, which applies the inks to the substrate without a fixed printing body. This easy handling makes digital inkjet printing unique in terms of flexibility and ideal even for small print runs up to individual printing.

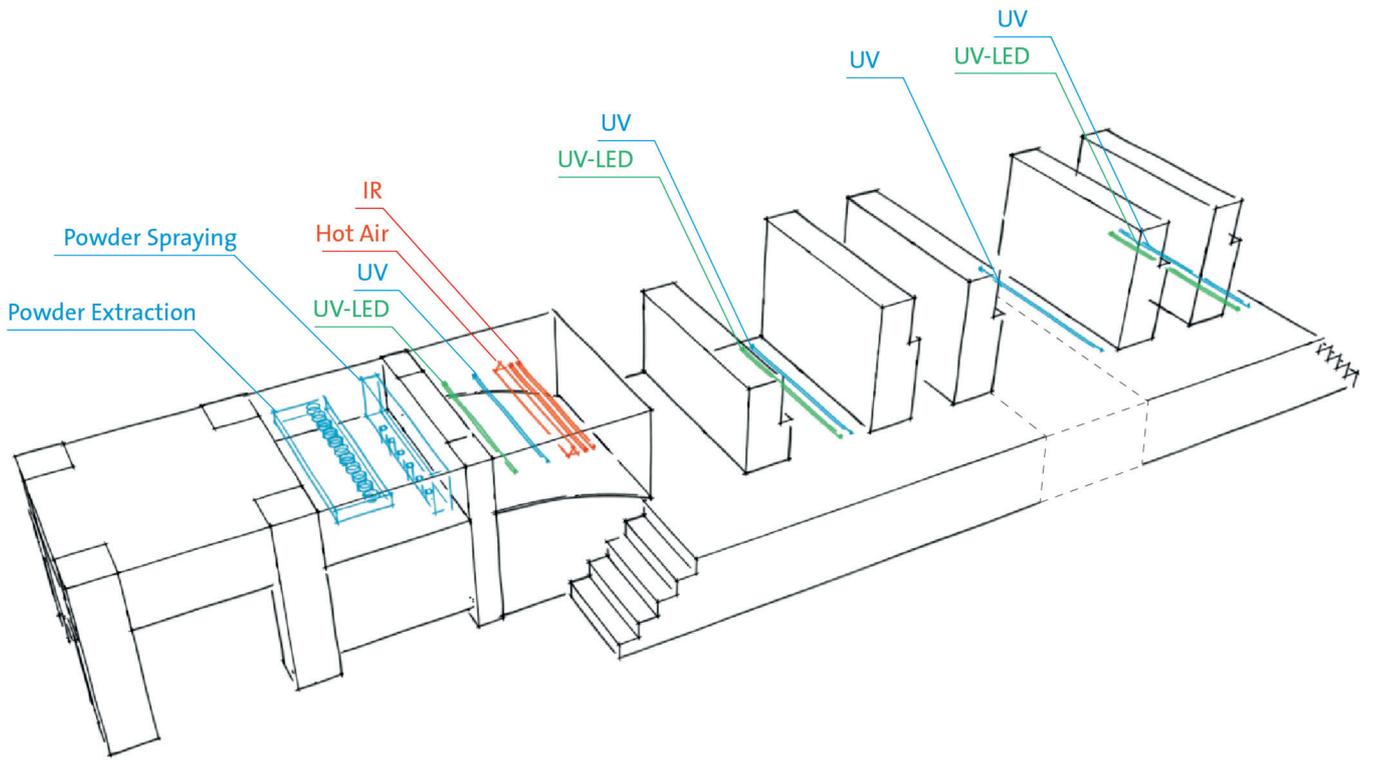
Whether it is conventional UV, LED-UV, or IR technology, Hönle offers high-end dryers for every digital inkjet application, from narrow web to XXL.

The UV-specific instantaneous curing enables special visual and tactile effects, resulting in visibly and tangibly better print results. Our LED-UV options allow for highly efficient outstanding UV quality — even for temperature-sensitive substrates.

Highest efficiency, maximum productivity, and future-proof sustainability guaranteed.







PARTNERS FOR SHEETFED PRINTING

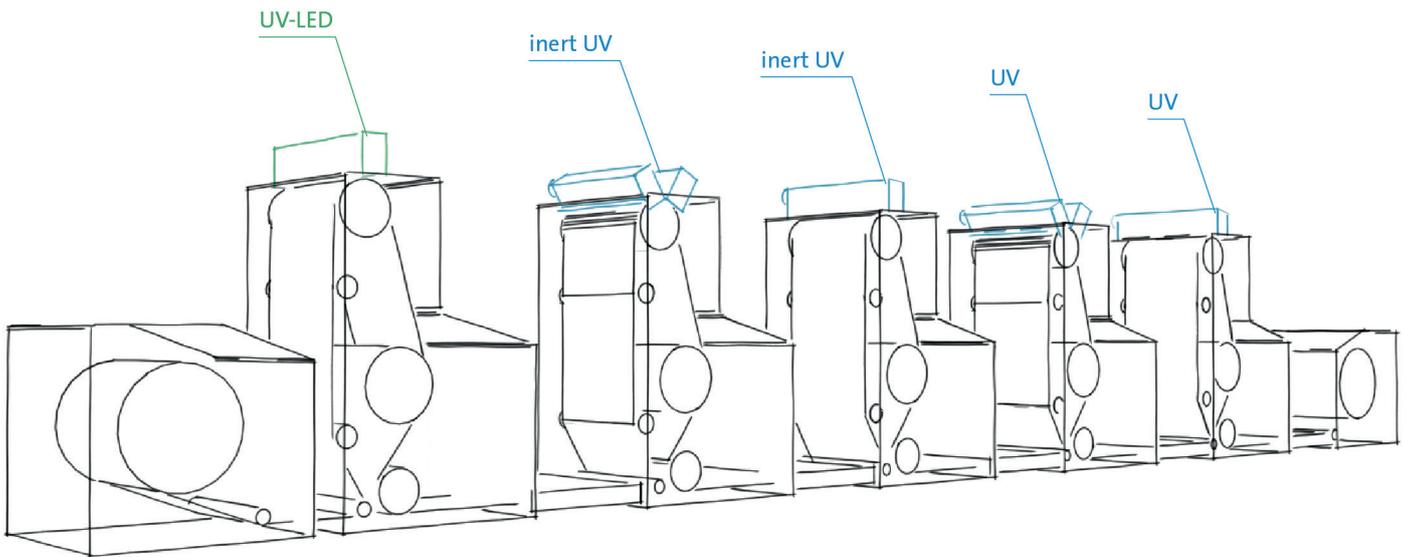
For smaller and medium print runs, sheetfed applications are usually the preferred choice, which – for these applications – is cost-effective, due to its high degree of flexibility. The applications are mostly in commercial and package printing, but also printed-value products such as banknotes, identity documents etc. are often produced in sheetfed processes.

We offer the entire range of products and services for sheetfed printing presses. For decades, we have been developing and manufacturing UV, LED-UV, infrared, and hot-air drying systems for any format.

In all our developments, our special focus is on energy efficiency as well as ensuring process safety and increasing the productivity of our customers.







HIGH-QUALITY UV SYSTEMS FOR WEB PRINTING

For web applications the printing substrate is not fed in sheets but from a roll. The possibility of printing face and reverse sides in sequential print units simultaneously, as well as the inclusion of directly attached folding units, as well as inline processing, leads to a significantly faster production process.

UV and LED-UV technology offer the highest quality, productivity, and efficiency in web printing.

Especially in Food Packaging, low-migration web-based inert dryers are used. They are characterized by precise measuring and control technology for inertization. This ensures safe production with low nitrogen consumption. Full cross-linking allows the reduction of photoinitiators and significantly decreases the migration of toxic substances.

The option for retrofitting, as well as hybrid UV and LED-UV modules, make the technology a future-proof solution.





MORE THAN THE PERFECT DRYING PARTNER

In addition to our high-tech curing and drying systems, we offer other solutions related to the printing press:

Coating Solutions for the Graphic Arts Industry

We stand for expertise and innovation in printing, coating and finishing of any substrate in both, the conventional and digital graphic sectors. We develop, manufacture, and distribute coating systems, components, and units for all types of coating applications. Our scope of delivery also includes spare parts, accessories, and coatings — and of course, we provide maintenance and service for coating systems and machines.

Our strength lies in customized solutions for new installations, but we also offer a comprehensive range of products and services for existing installations as well as retrofits.

Solutions for UV Measurement

To ensure consistent quality in printing processes, regular UV measurement is strongly recommended. With our measurement technology, you can check dosage and intensity. The intuitive operation ensures easy and reliable

measurement in all UV and LED-UV applications. For optimal process safety.

Powder Systems for Sheetfed Printing Machines

For decades, we have been developing and manufacturing powder application and powder extraction systems which are used in sheetfed printing worldwide. Why? Because we are the best partner when it comes to developing complex, customized process solutions.



Spraybar for powder application

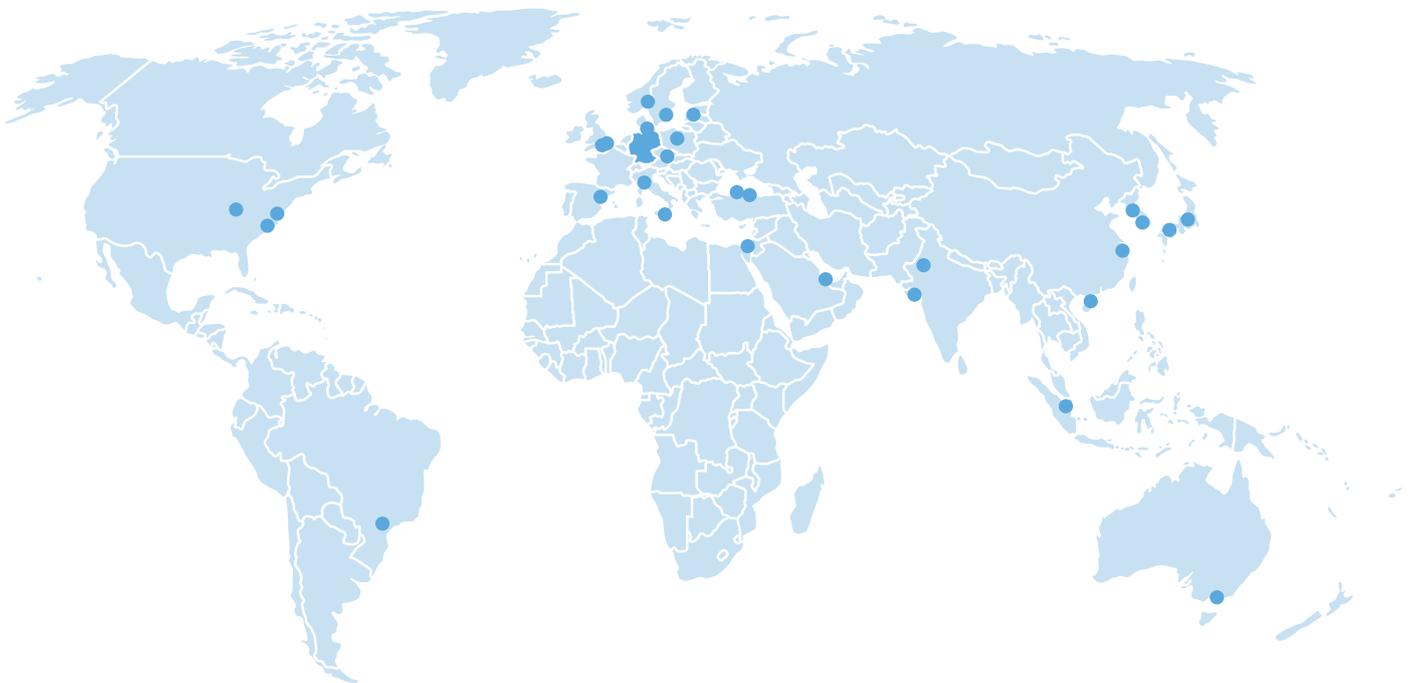
LIFECYCLE SOLUTIONS

Service is an Attitude

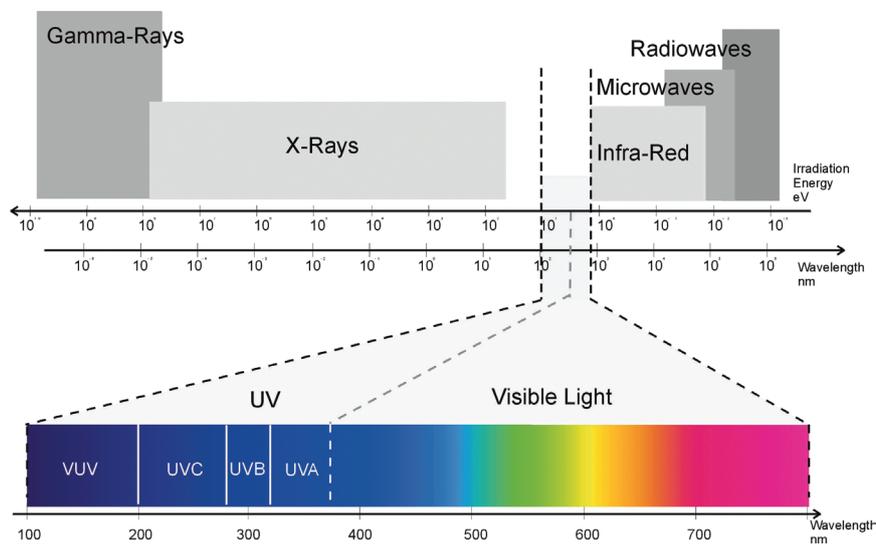
Our collaboration with the customer does not end with the installation of the product. We take service very seriously. You need support? We are here for you — worldwide, seven days a week, around the clock, throughout the entire lifecycle of the printing press.

Whether it is about preventive maintenance, retrofitting, or a problem occurs during the process: with service technicians stationed around the world and decentralized spare parts warehouses, we are quickly on site. And if quickly is still not quick enough, we provide immediate assistance with augmented reality-based remote service. All this ensures a sustainable printing process.

We make sure production keeps running.



TECHNOLOGICAL BASICS



Both UV and IR rays are part of the electromagnetic spectrum. Their rays range from extreme short-wave gamma rays and x-rays through to visible light and long-range radio waves.

A small range of this spectrum, from approximately 400 to 800 nm, is visible light. Adjacent to the shortwave blue end of visible light, from approximately 100 to 400 nm, are UV rays, the working range of the Höhle Group.

We develop devices that make UV rays usable for all cross-linking processes in industry, such as curing paints

and varnishes. Energy efficiency is an issue that has been important to us for many years. We therefore place great importance, even at the construction phase, on radiation characteristics with high efficiency for all systems.

However the Höhle Group has also mastered the other end of the spectrum: IR rays start at the long-wave red end of visible light, at approximately 800 nm; these are used for drying processes, such as when evaporating water or solvents.

Our engineers are also developing pioneering drying systems in this field.

What can UV do?

A brief summary of UV curing

UV curing is the preferred drying technology for many printing and finishing areas. Conventional UV systems are based on medium-pressure lamps, which emit a significant spectrum with a high percentage in the UV range using high-voltage arc plasma. This radiation has the correct wavelength and energy to polymerize the photoinitiators and oligomers contained in the coatings into a three-dimensional network in a split second.

The use of UV inks and varnishes has many advantages, the most obvious being the improved quality of the end product. Special effects, such as gloss (95 gloss units),

mat, lenticular, changing, or holographic effects, together with a very high resistance to scratching, are achieved by the use of UV technology and finish the end product to a high standard. This applies not only to printed materials such as paper and cardboard, but also to sheets, aluminum coatings to mention a few.

Further benefits for the printer: increased “pot life” of inks or varnishes, no spray powder – and the possibility to immediately process the product. This all makes UV printing efficient, low-maintenance, and guarantees the highest quality.

Properties of UV curing:

Time:

The cross-linking that takes place in a split second allows immediate quality control and processing of the product.

Energy and environment:

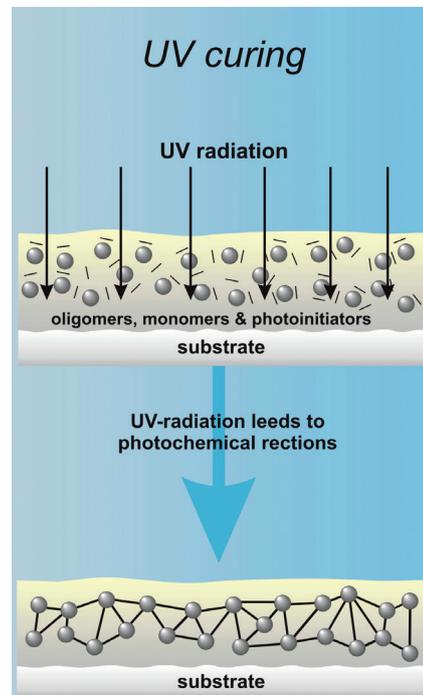
UV cured coatings are usually 100% solvent-free systems which do not need a drying oven or VOC disposal.

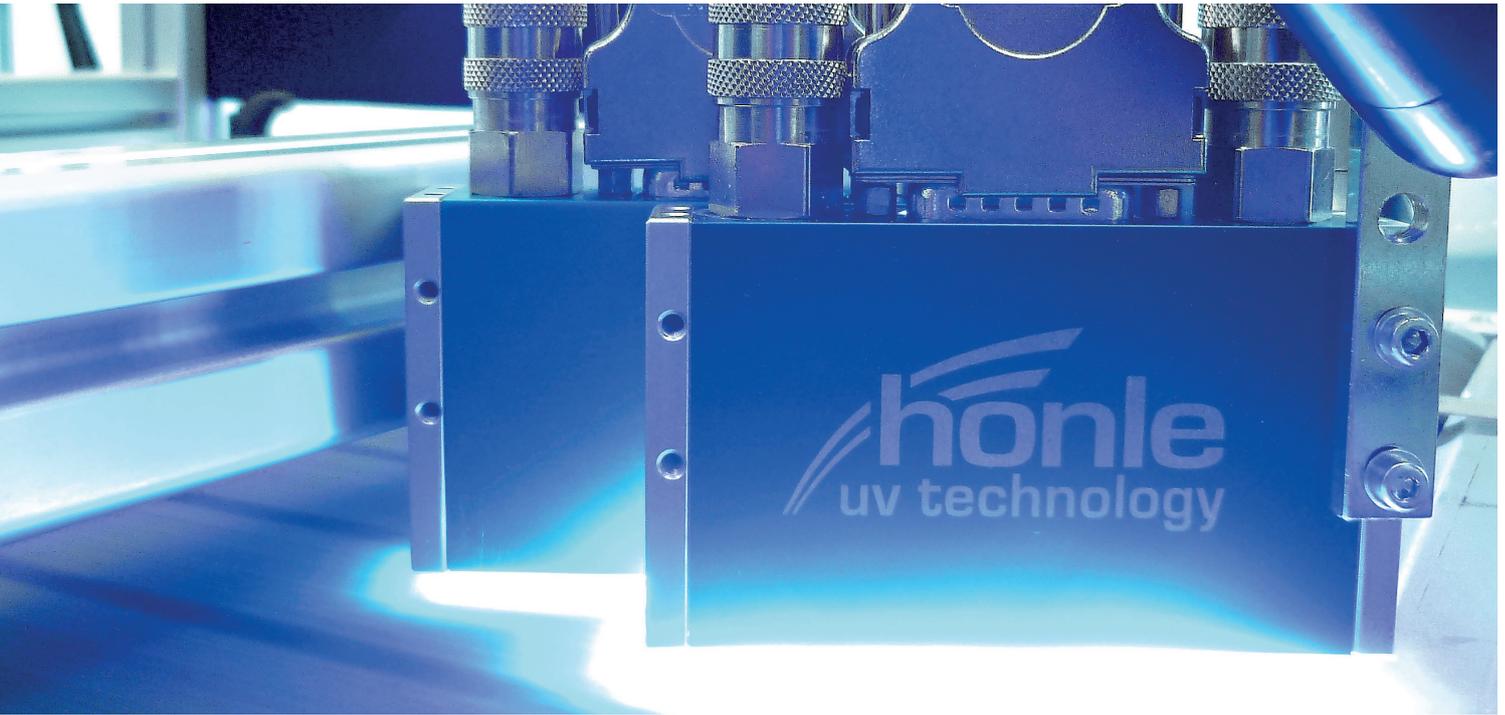
Quality:

Due to chemical polymerization, high-quality coatings are created that are characterized by high chemical resistance and the best surface properties, such as exceptional scratch-resistance.

Gloss:

Extremely high degrees of gloss of up to 95 gloss units are typical for UV cured varnish systems.





LED Powerline in application

LED-UV curing – a variant for the future

A comparatively new variant of UV curing is the use of UV-LEDs. In contrast to the gas discharge technology of the medium-pressure emitters, UV-LEDs are based on semicon-

ductor electronics. By applying voltage, the UV diodes emit a virtually monochromatic spectrum in the specific wavelengths 365/375/385/395/405 +/- 10 nm.

Properties of LED-UV curing:

Space required:

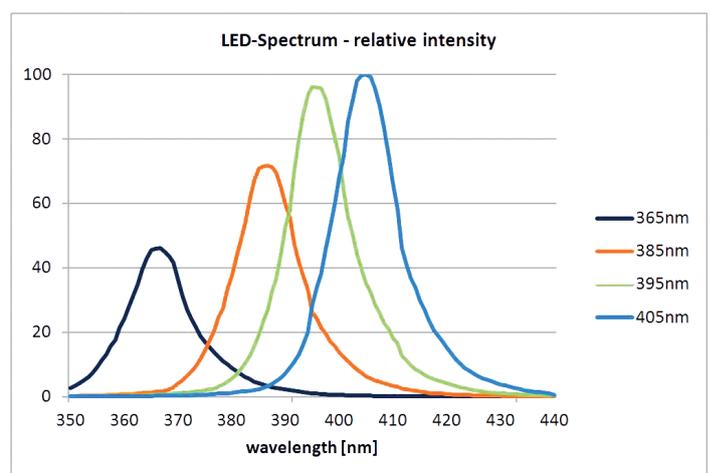
Less space required: Due to the small dimensions of the diodes, LED units can be designed in a very compact form, saving space.

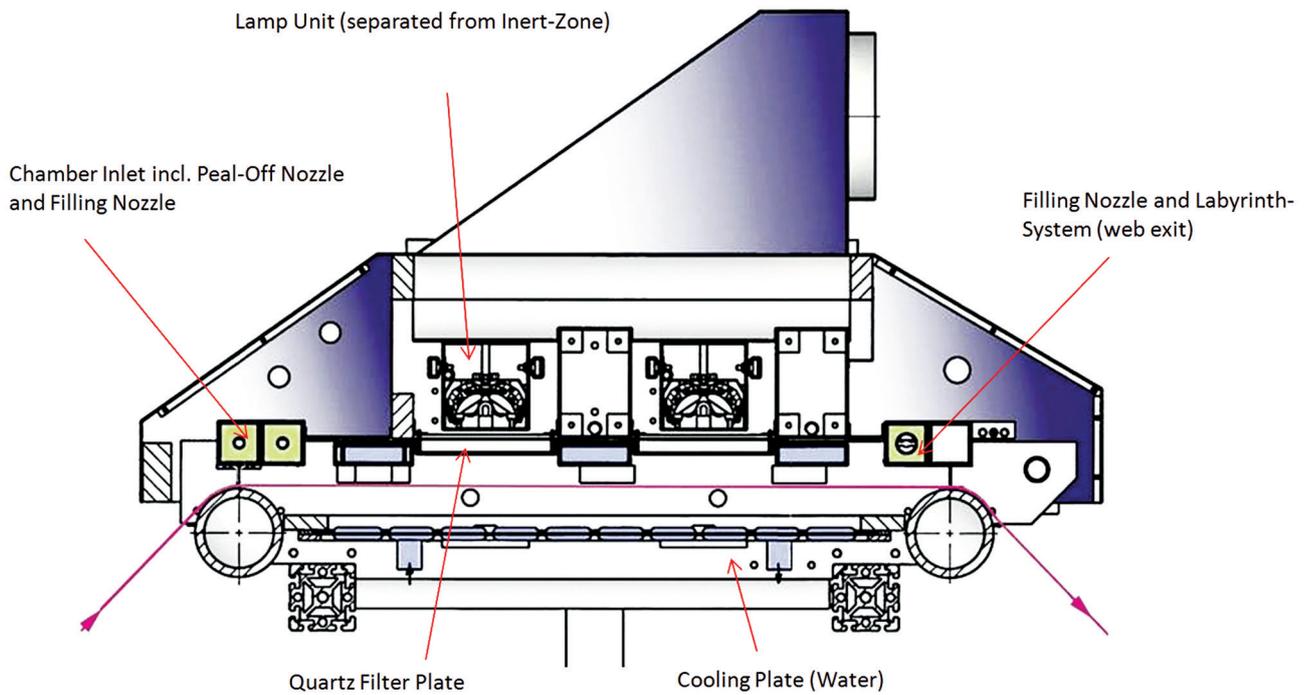
Function:

The digital functioning of the LEDs allows cycled on/off operation in the millisecond range.

Heat:

UV-LEDs do not emit IR rays and lead to a low temperature load in the hardening process.





Inertization for UV processes

The polymerization process can be inhibited by atmospheric oxygen that is present on the surface of the coating medium during cross-linking. This leads to lower speeds

and lower degrees of cross linking. During inertization, the atmospheric oxygen is replaced by an inert gas such as nitrogen.

Properties of inertization:

Process speed:

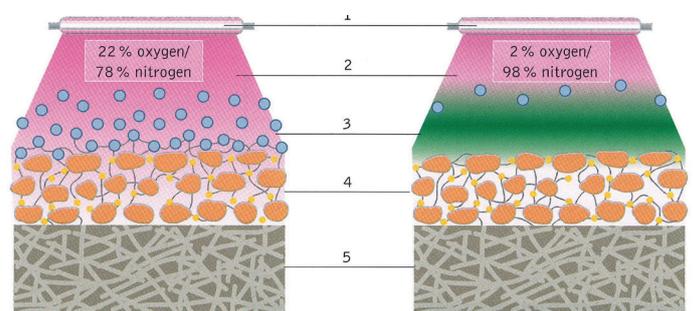
Polymerization is unaffected by oxygen, which means that the line speed can generally be increased.

Packaging:

In an inert atmosphere the amount of photoinitiators can be reduced to a minimum.

Surface:

The surface properties, such as hardness and resistance to solvents or scratches, are increased considerably by inertization. Systems with long-wave photoinitiators can also be used with this technology. Thus inertization is an interesting variant for UV-LED curing, too.



IR / hot air drying of dispersion varnishes

Dispersion varnishes have a wide range of applications in the printing industry. They are dried by using ink penetration and evaporation. The print substrate absorbs the fluid parts of the paint during ink penetration. To speed up the ink penetration and evaporation, an IR/hot air dryer

is used. The water content is vapourized by the IR rays. The air with the vapour is then led away using an exhaust system. There is physical cross-linking in the drying process, which gives the dispersion varnish good mechanical solidity.

Properties of the IR/hot air drying:

Time:

Quick “touch” drying allows maximum machine speeds and reduces waiting times.

Energy and the environment:

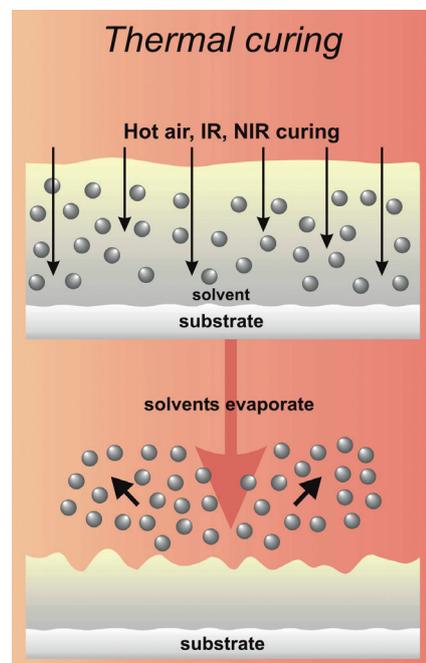
Dispersion varnishes have no adverse effect on human organisms and allow drying with a comparatively low amount of energy being consumed.

Quality:

Dispersion varnishes can be processed very easily. The coating systems offer increased resistance to scratches and abrasion on the surface with significantly less powder being required, in comparison to coatings that dry by means of oxidization.

Gloss:

With IR/hot air drying clear-coat varnishing systems, extremely high degrees of gloss of over 90 gloss units are possible.



UV coatings

Chemical suppliers and formulators offer UV curing formulations for many areas of the coating industry. Thus the selection of suitable UV coatings is very diverse. The applications range from UV inks, UV adhesives, silicones and varnishes through to laminations and PSAs.

For each coating and usage we configure the optimum drying system in terms of performance, spectrum and energy efficiency.

The offered range of UV-LED curing varnishes and inks for coating applications is steadily increasing. We provide perfectly adapted UV-LED systems.

IR lamps in combination with hot air are used for drying water-based inks, varnishes, adhesives, and other functional coatings. Moreover IR systems are applied for heat-reactive coatings, as for example for fusing and hardening powder coatings.

Precise adjustment of wavelength, power, and configuration to the properties of each application leads to excellent results in drying and heating processes.

Technology of powder systems

The use of effective powder systems is indispensable in sheetfed printing processes, which do not work with UV technology. During colour printing dosing and applying powder on the sheets is necessary to prevent them from sticking together. Powder is also used as an anti-friction agent for the further processing of coated sheets.

Dosage:

Precise dosage allows the user to bring only a small amount of powder in the printing machine and as a consequence to reduce the contamination to a minimum. The powder is applied with a nozzle bar in combination with a compressed-air feed adjusted to the plant. This process allows the smallest possible amount of powder for an optimum flatness of the stack.

The challenge for powder systems is to apply the powder consistently on the sheet, at any printing speed and for all format classes.

Exhaust:

In combination with their powder systems, we also offer the right powder exhaust systems for sheetfed printing.

HEADQUARTERS

Dr. Hönle AG – UV-Technology
Nicolaus-Otto-Str. 2
82205 Gilching
T: +49 8105 2083 0
F: +49 8105 2083 148
uv@hoenle.de
www.hoenle.com

Dr. Hönle AG
Division Eltosch Grafix
Fahltskamp 64
25421 Pinneberg
T: +49 4101 5150 700
F: +49 4101 5150 729
info@eltosch-grafix.de
www.eltosch-grafix.com

PrintConcept UV-Systeme GmbH
Philipp-Jakob-Manz-Str. 18
72664 Kohlberg
T: +49 7025 91277 0
F: +49 7025 91277 660
office@printconcept-uv.de
www.printconcept-uv.com

GEPA Coating Solutions GmbH
Hauptstraße 27
88699 Frickingen
T: +49 7554 989770 0
info@gepa-cs.de
www.gepa-cs.com