

Lambda DIGITAL Drying

Wavelengths ahead


LAMBDA POWER

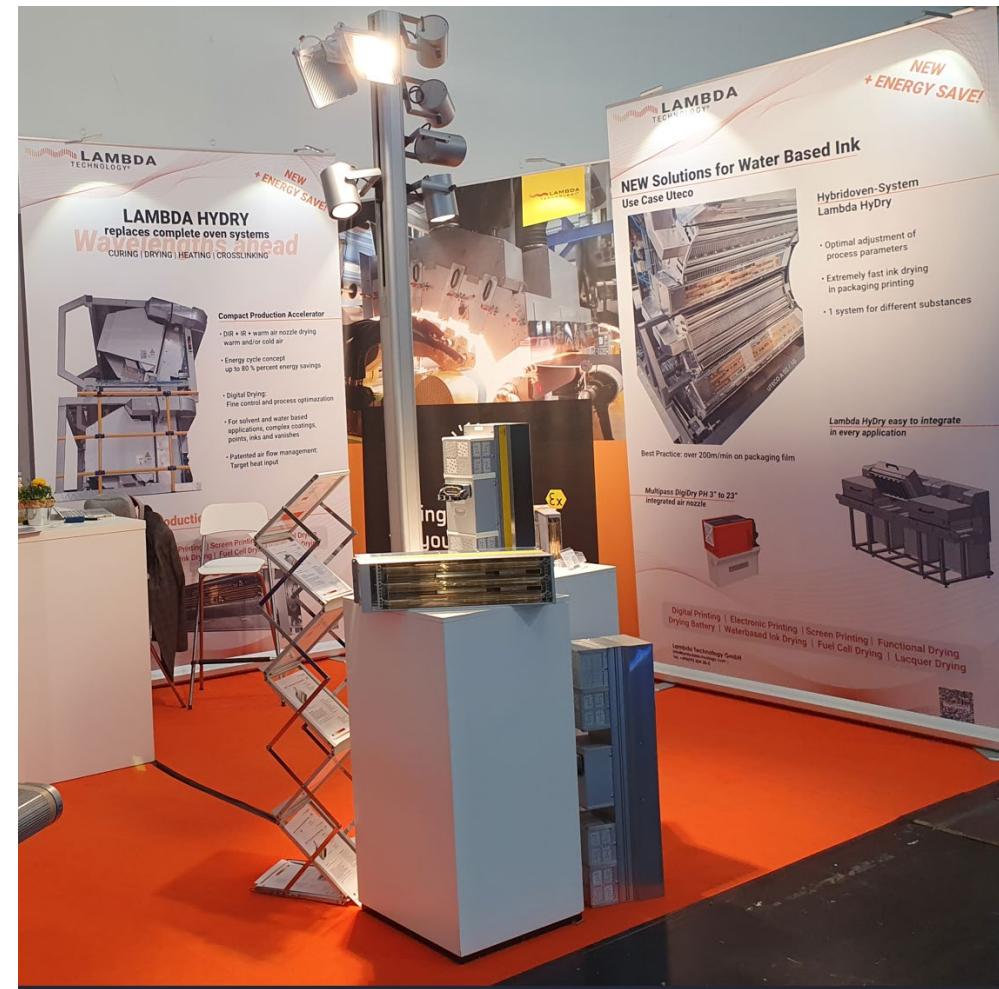
**for YOUR drying tasks
for various applications,
reduce your energy costs and your carbon footprint**

Gunther Ackermann, Christian Gächter
03/2025

Lambda Digital Drying Systems

Our USPs

- industrial experience for both, bespoke solutions and serial production
- emitter protected by quartz glass panel
- two separate yet combinable air circulation paths for emitter cooling and substrate/layer treatment
- compact mechanical integration due to modular design
- long lifetime of the system and the emitters also in challenging 24/7 operation cond.
- ATEX possible  II 3G Ex pzc IIB T3 Gc



What is drying?

Drying inks is not just evaporating solvent!

We do expect from a dried liquid:

- cross-linking (adhesion to the substrate)
- cohesion (inner stability and functionality of the layer)
- physical (eg. electrical or thermic conductivity, structural properties),
- or chemical (evaporation, oxidation or polymerisation) properties

**Drying is the process to activate the solvents
and to transfer them out of the system**



What does digital drying have to do with sustainability?

Our mission goal:

- **Saving energy and space and raising productivity**
- **by replacing carbon-based drying processes with**
- **green energy processes that are more cost-effective**



What does digital drying have to do with sustainability?

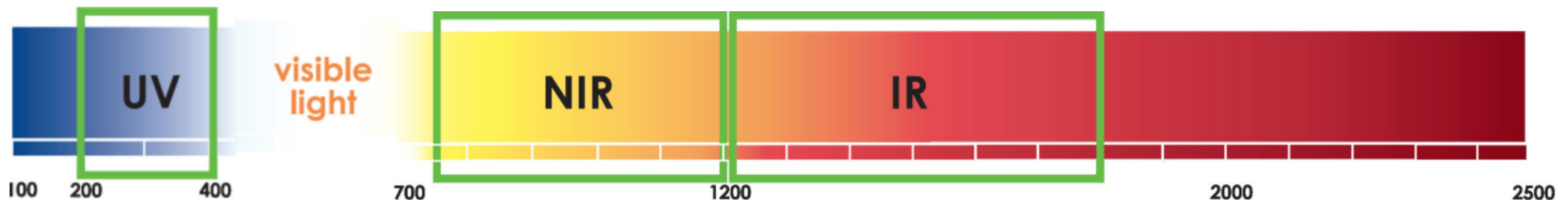
- Industrial + commercial processes require heat to change materials, coatings or products, for production processes such as casting, hardening, sintering, firing or for drying processes.
- Process heat accounts for 66% of the total industrial energy consumption, making it the most important commercial handle to reduce costs
- Process heat in industry accounts for 21.6 % of total energy consumption in Germany (2015, source: Federal Environment Agency)



Process optimized technology

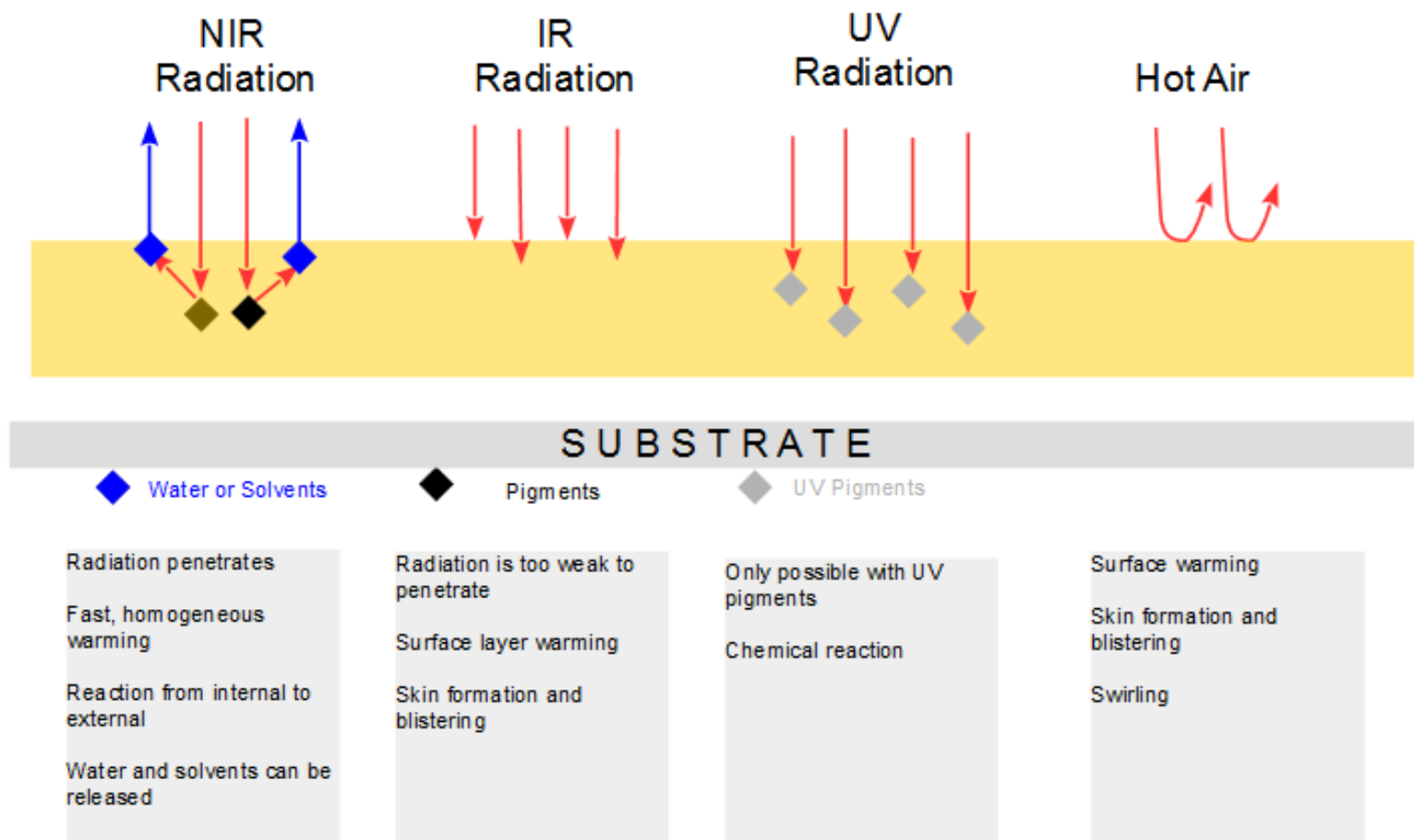
Innovative drying and cross-linking technology

- the shorter the wavelength the deeper the penetration into the coating
- highest effectiveness of energy input
- reduced penetration into the substrates
- due to extremely fast process
- long lifetime of the emitters
- different types of emitters are interchangeable
- combination of air technology (cold + warm) matched radiation technology



Process optimized technology

Innovative drying and cross-linking technology



What does digital drying mean?

In physics digital means the resolution of a process in it's single steps and full gradual control of each and every step

In drying these steps consist of

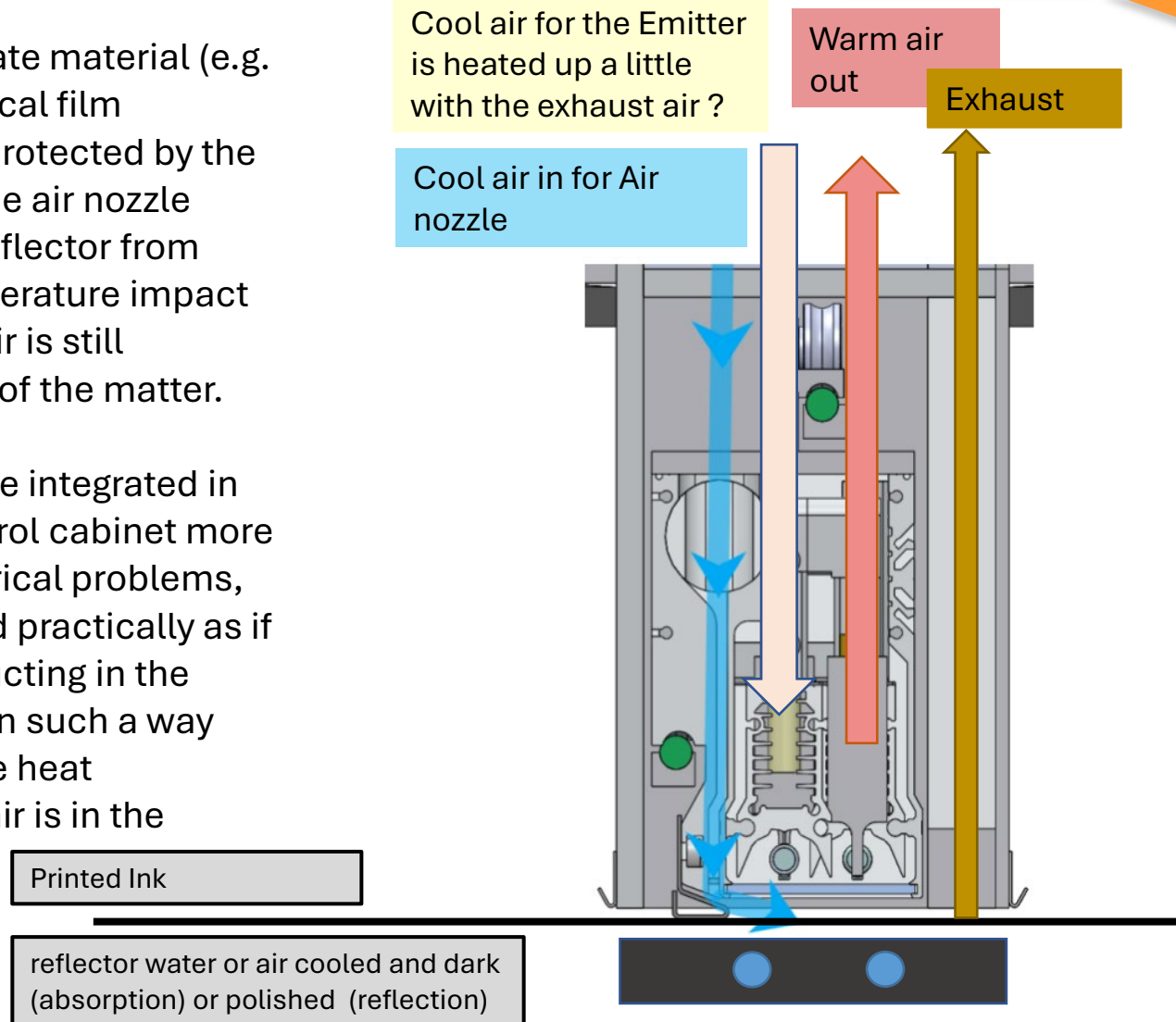
- radiation intensity → full irradiated field can be used
- wavelength → stable wavelength at all power levels
- time → in web is speed of line or stretch
- internal and external air flow → volumes and speed controllable
- air management → temperature controllable
- excess radiation removal → via reflector/absorptor
- energy recovery and reuse → air for cooling the lamps is used for process as warm air



Dryer concept with cool air protecting the substrate

When drying is necessary on delicate material (e.g. thin plastic films, temperature critical film material, etc.) the film material is protected by the incorporation of cold air through the air nozzle from top and through the cooled reflector from below. With these measures, temperature impact can be controlled whilst the cold air is still managing effectively the transport of the matter.

Electrical sensors and thyristors are integrated in the module, which makes the control cabinet more compact and, in the event of electrical problems, the electrical units can be replaced practically as if they were circuit boards. The air ducting in the module has all air ducts arranged in such a way that all air ducts are separated. The heat exchanger to preheat the radiator air is in the supply air area.



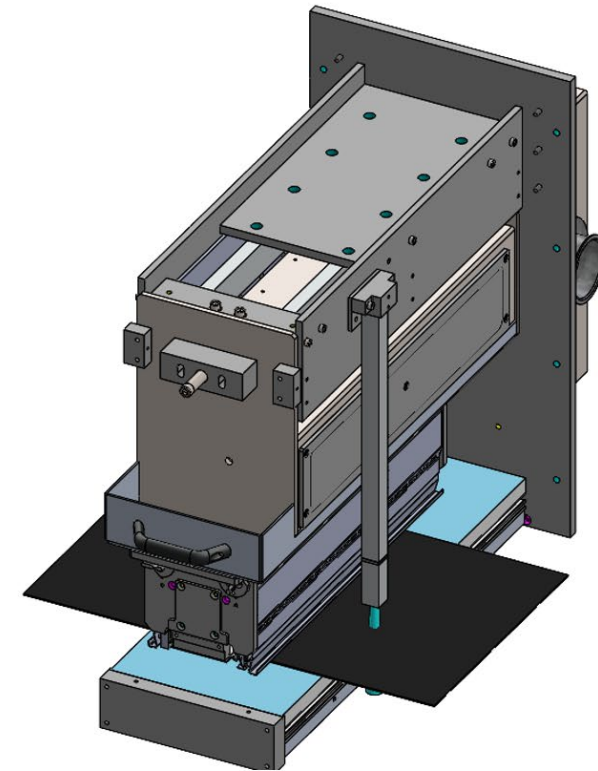
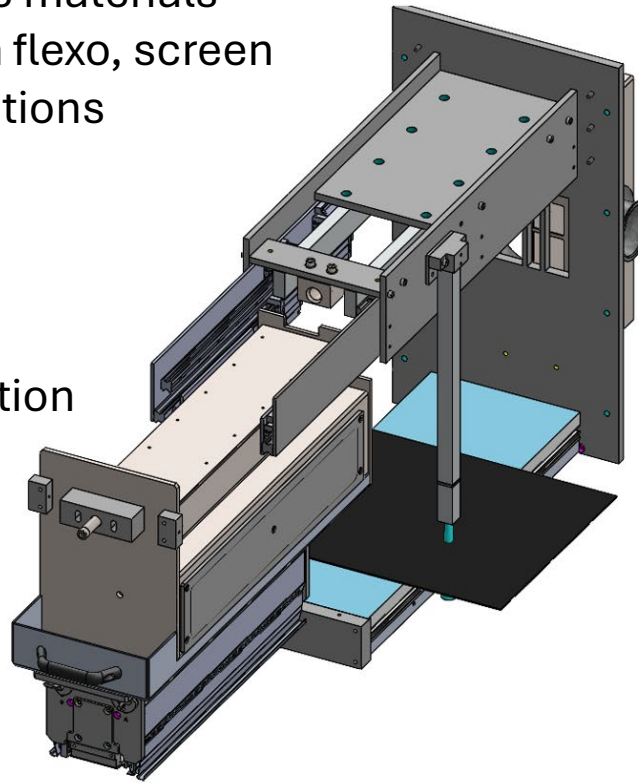
Digital Drying Systems

arranged as a lengthwise module for high
power densities over short distances

- for tacted drying of coatings
- for tacted drying of base materials
- for single color drying in flexo, screen and rotogravure applications

available from 30 cm web
to any bespoke width

stable and reliable production
through pyrometer and
Lambdas proprietary
DIGITAL DRYING®
technology



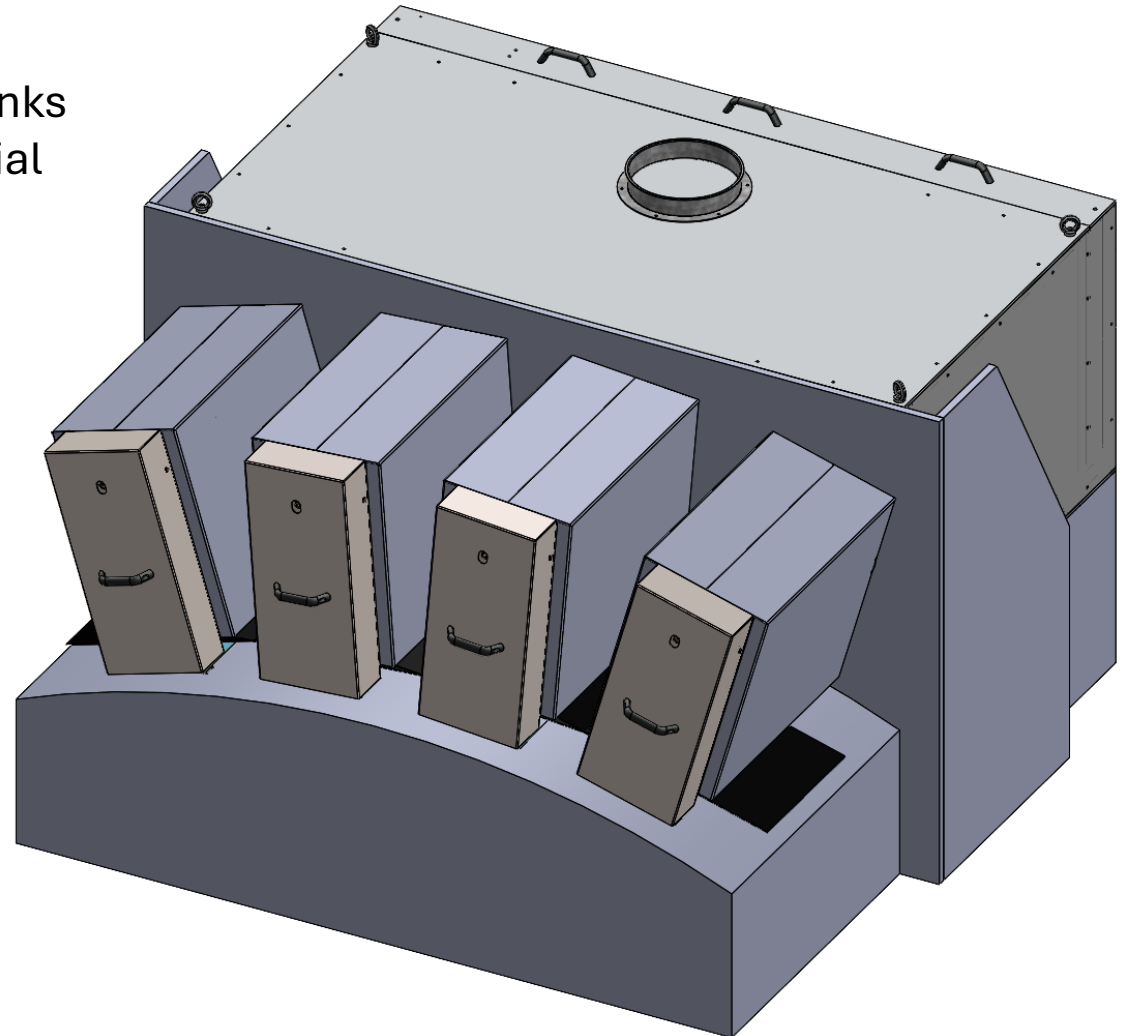
Digital Drying Systems

arranged as a lengthwise module for high speed web –
complex drying over short distances

- for tacted drying of digital print inks
- for temperature sensitive material in coating applications
- cooled bed protects material

available from 30 cm web
to any bespoke width

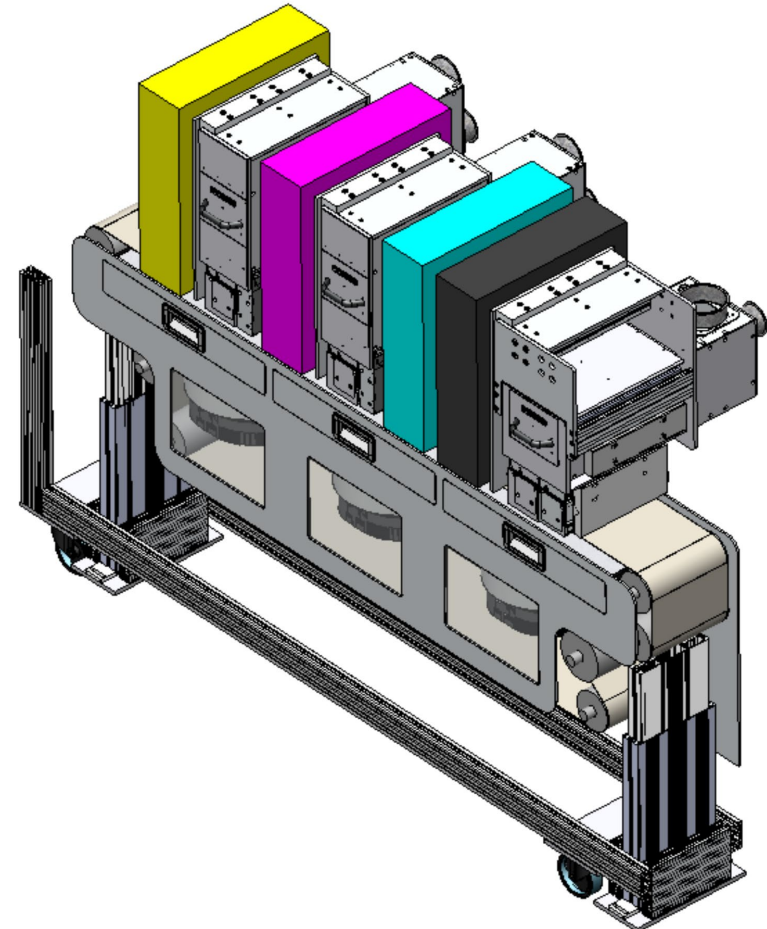
stable and reliable production
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technology



SINGLEPASS Drying

With vacuum conveyor belt

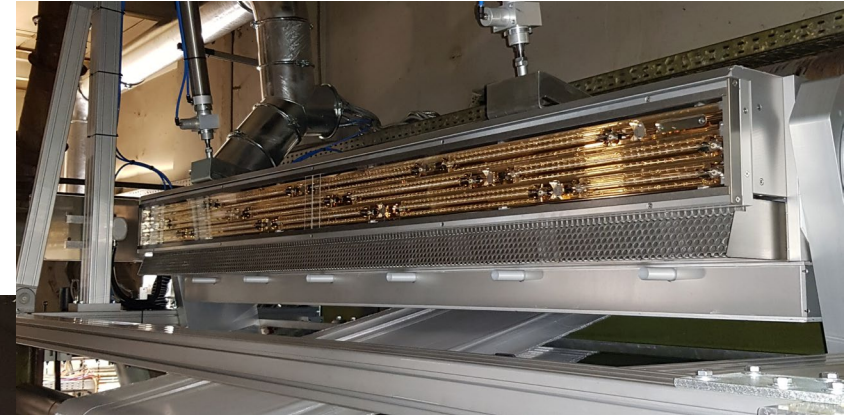
- pinning module after every ink
- vacuum belt (cooling via the belt)#
or
- thin mesh VA stainless steel belt
- bespoke solutions for all web widths
- NIR modules with 1/2/3 emitter rows



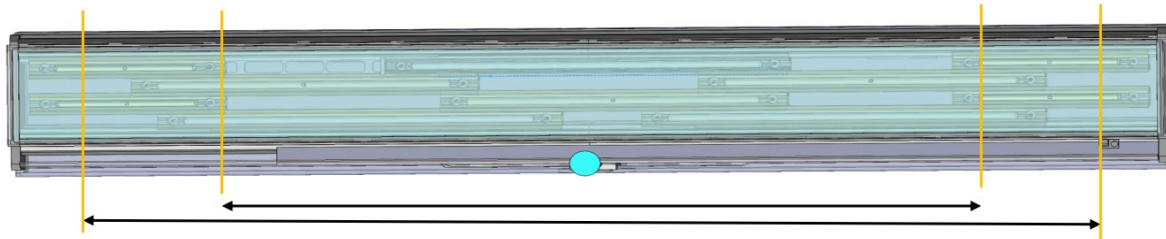
Booster Solution

raise profits – reduce CO₂ footprint

- air nozzle, with warm or cold air
- high power with NIR + IR
- on spot extraction of exhaust air
- process control and regulation possible



- module power 60 to 100 kW
- web width from 30 cm to whatever width needed
- productivity increase up to 50% with one single module
- energy savings up to 50 % at stable production speed
- 20 cm minimum space requirement in your web

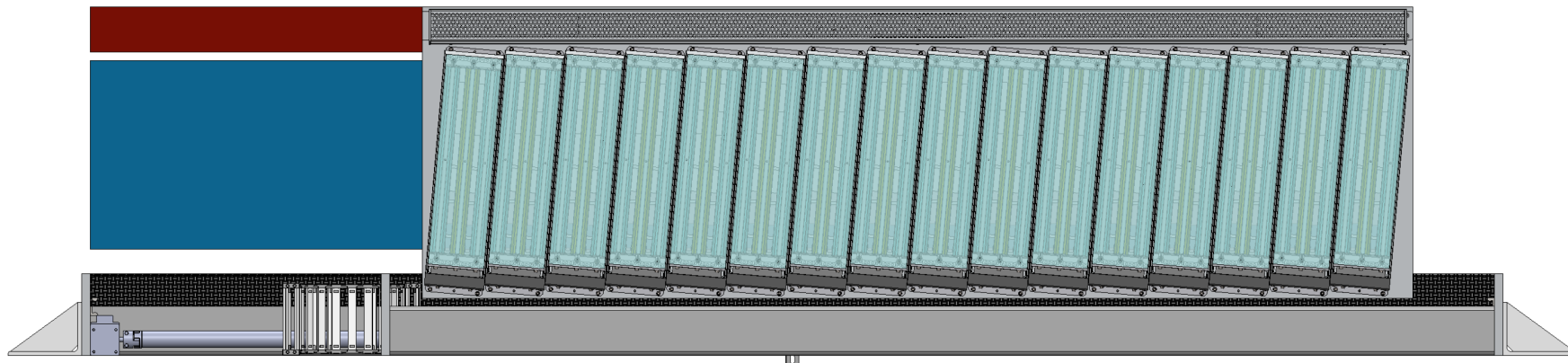
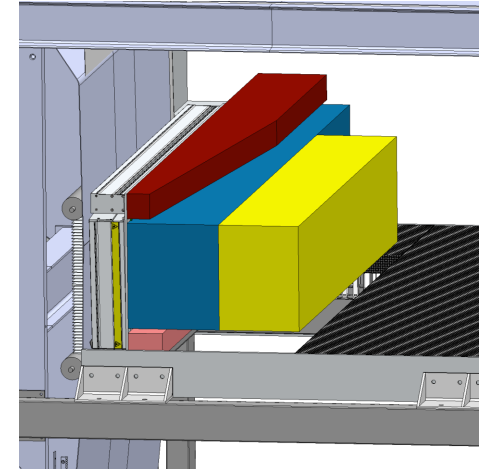


Emitters are arranged in a way that edge areas can also be switched off

Digital Drying Systems

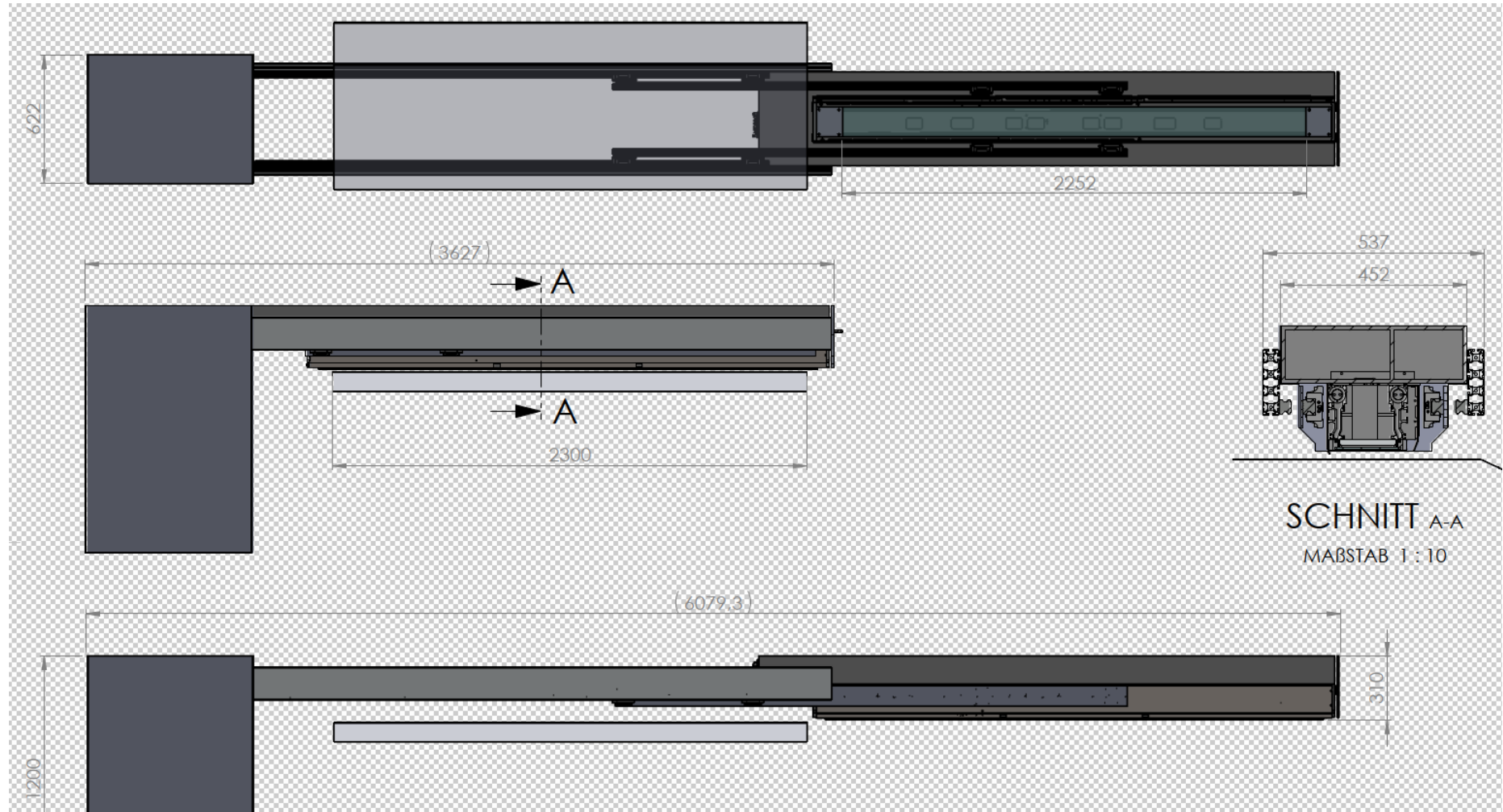
arranged as a lengthwise module for high power densities over short distances

- Emitter protected by special glass panel
- Separate air circulations for emitter and colour
- Effective emitter design with different wavelengths
- Compact mechanical integration due to modular design
- Long lifetime of the system and the emitters



NIR -PH transversal module

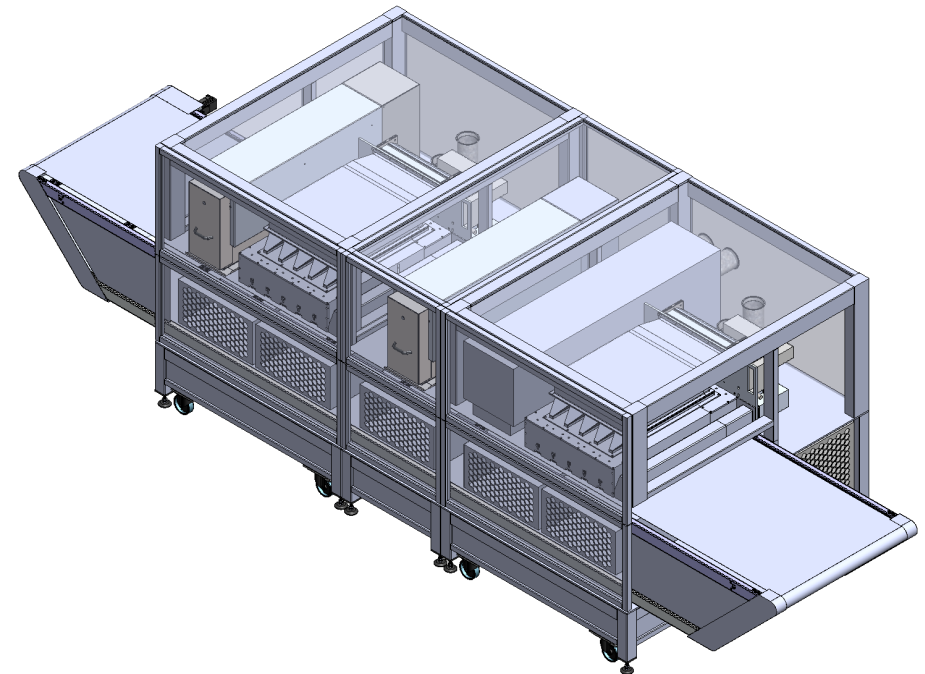
Modules as pull-out systems



NIR – modular conveyor belt system

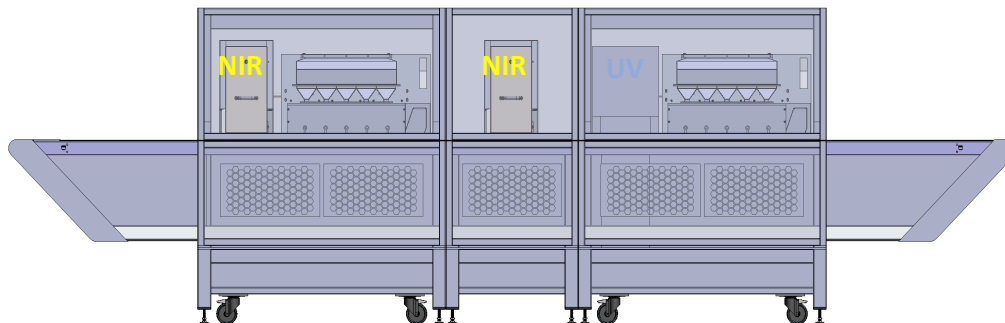
for screenprint and direct-to-object applications

- bespoke setups and widths for thermal treatment and controlled cooling
- high power density with NIR
- on spot extraction of exhaust air
- process control and regulation possible
- combination with other curing methods (mercury UV, LED UV, e-beam, etc.)
- web speeds up to 100 m/min



Warmluft
Trockner

Kühlstrecke

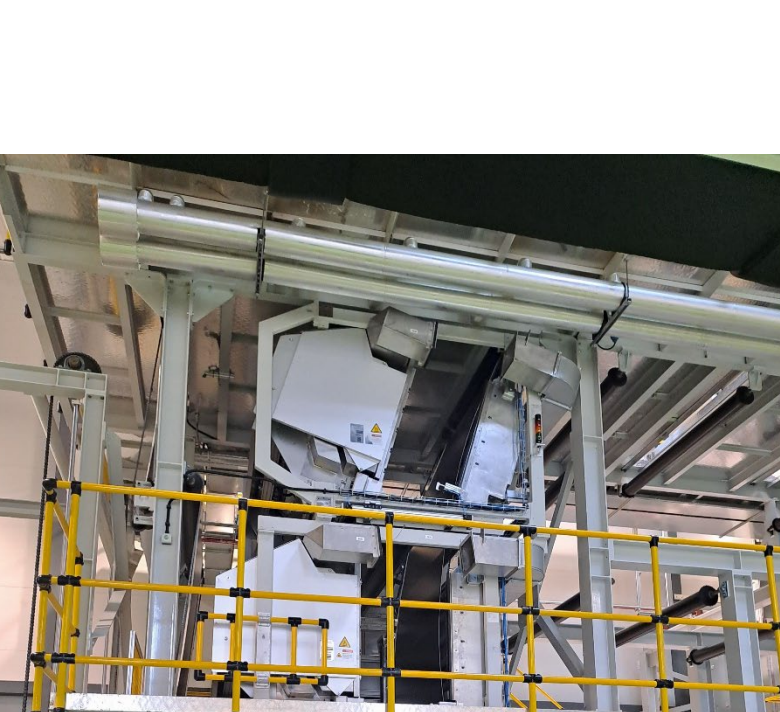


up to 60 %
less
energy &
space

installed in 2024

LAMBDA HyDry roto-print dryer station

complete 600kW installed electricity power instead of natural gas furnace with a power of 3.500kW



Design, Engineering and Manufacturing by:

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