

THE IMPORTANCE OF AIR MANAGEMENT FOR DRYING PROCESSES WITH INFRARED HEAT

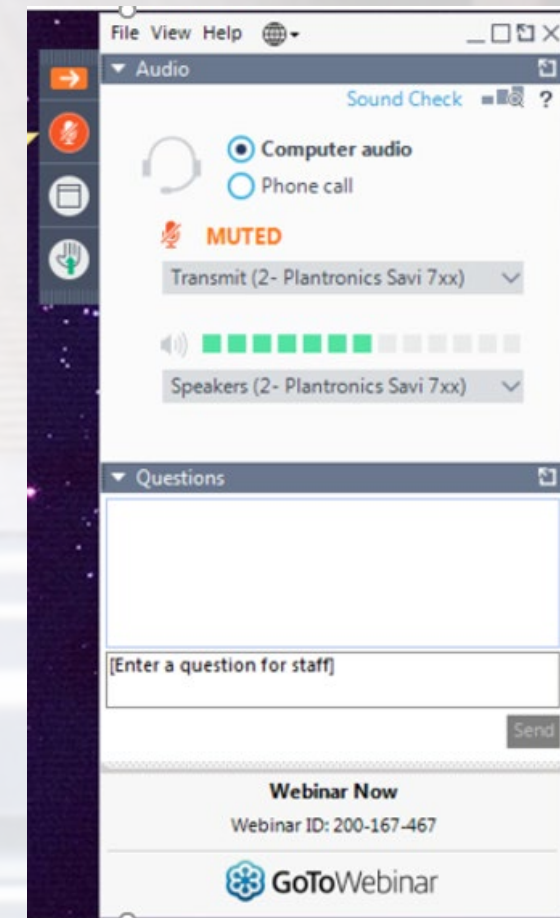
Drying Technology and Practical Applications
Vincent Krafft – 2nd July 2020





HOUSEKEEPING

- ▶ Webinar duration: presentation: 30-40 min with additional 20 min for Q&A
- ▶ This webinar will be recorded and every registrant will receive a link to the recording and handouts
- ▶ All attendees are muted by default
- ▶ Questions can be submitted ONLY via Go To Webinar Question's box at any time, we will address them at the end of the presentation
- ▶ If you are joining via "Computer audio", we recommend using a headset
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YOUR PRESENTERS TODAY



Dr. Marie-Luise Bopp

Project Manager Marketing Infrared
Heraeus Noblelight



Vincent Krafft

Infrared Application Engineer
Heraeus Noblelight



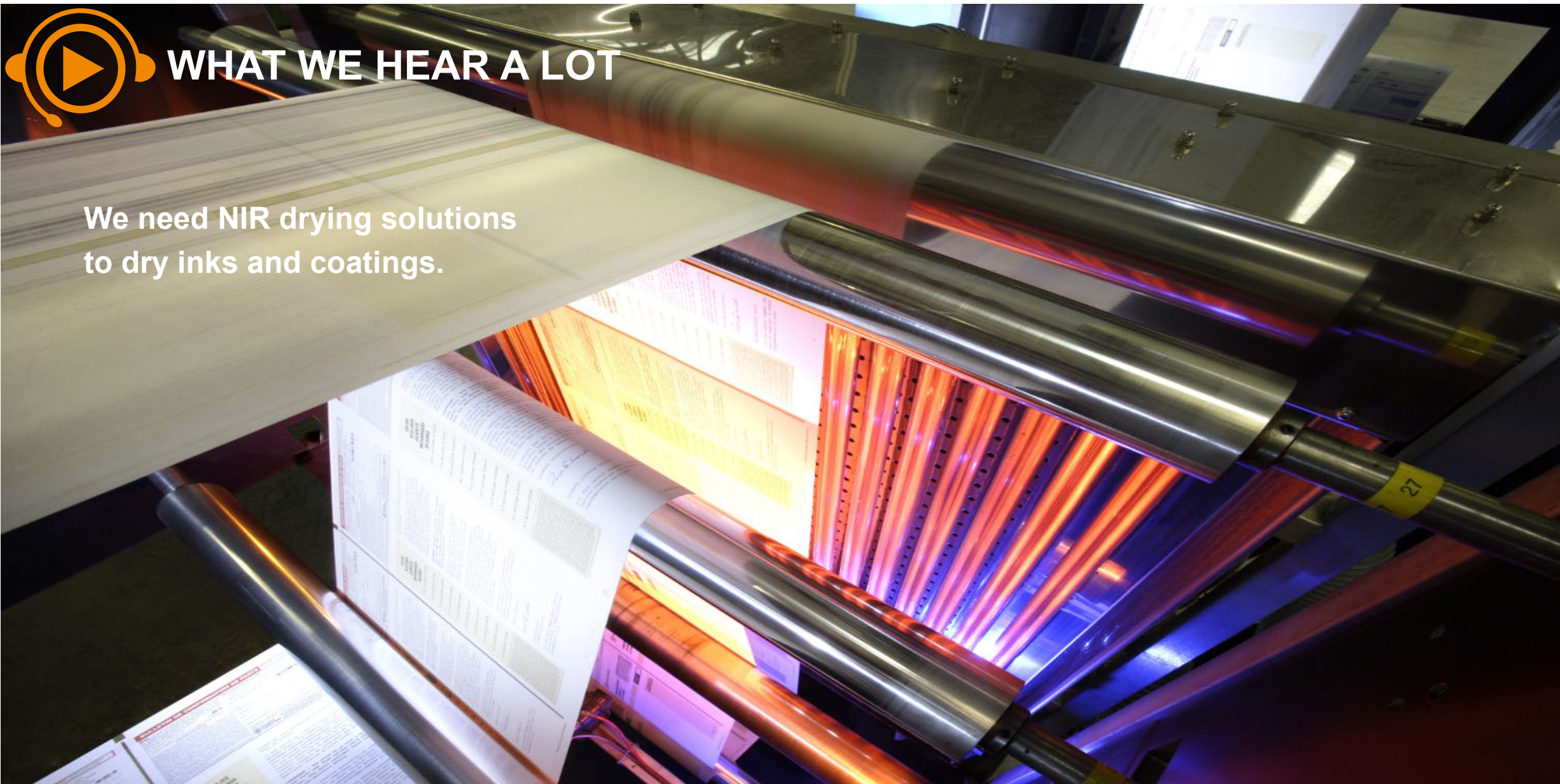
AGENDA

- ▶ Influence of wavelengths
- ▶ Principles of IR systems
- ▶ Benefits of fluid dynamics
- ▶ Challenges of drying processes
- ▶ Q&A session



WHAT WE HEAR A LOT

We need NIR drying solutions
to dry inks and coatings.





WHAT WE HEAR A LOT

Infrared is burning black printed areas while yellow areas are still wet.





WHAT WE HEAR A LOT

Evaporated moisture is staying around the IR module.

Moisture is not well extracted.

Moisture can create condensed water on other components.

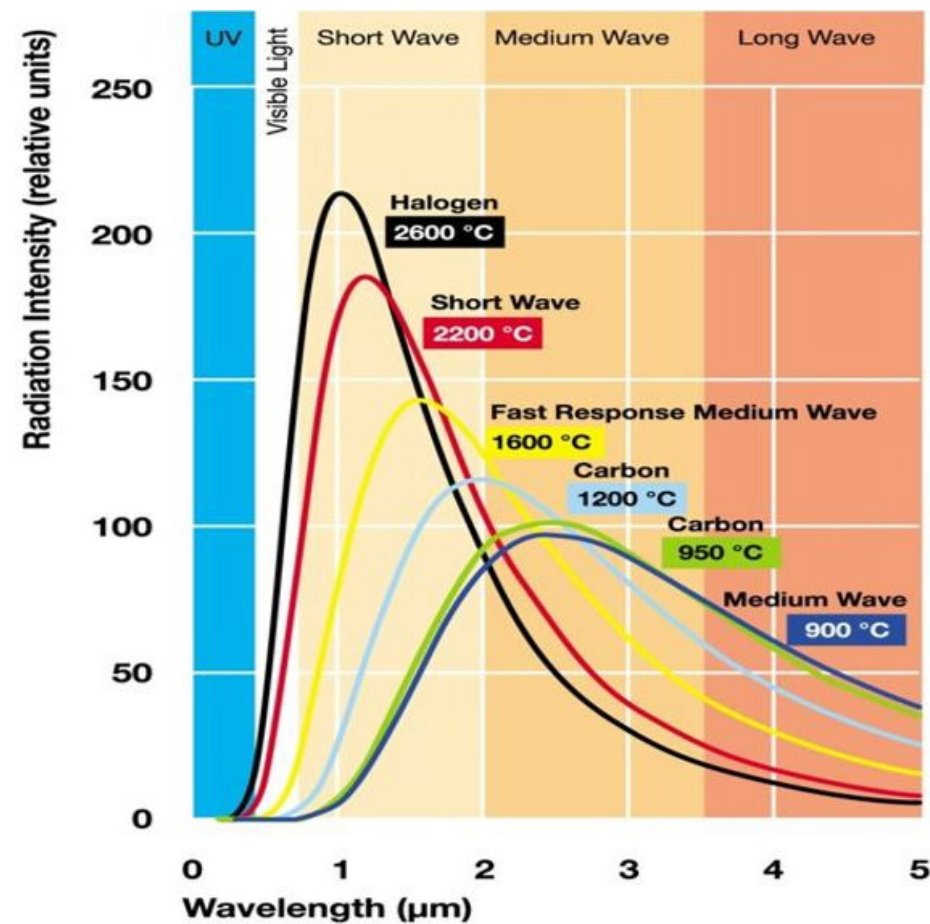
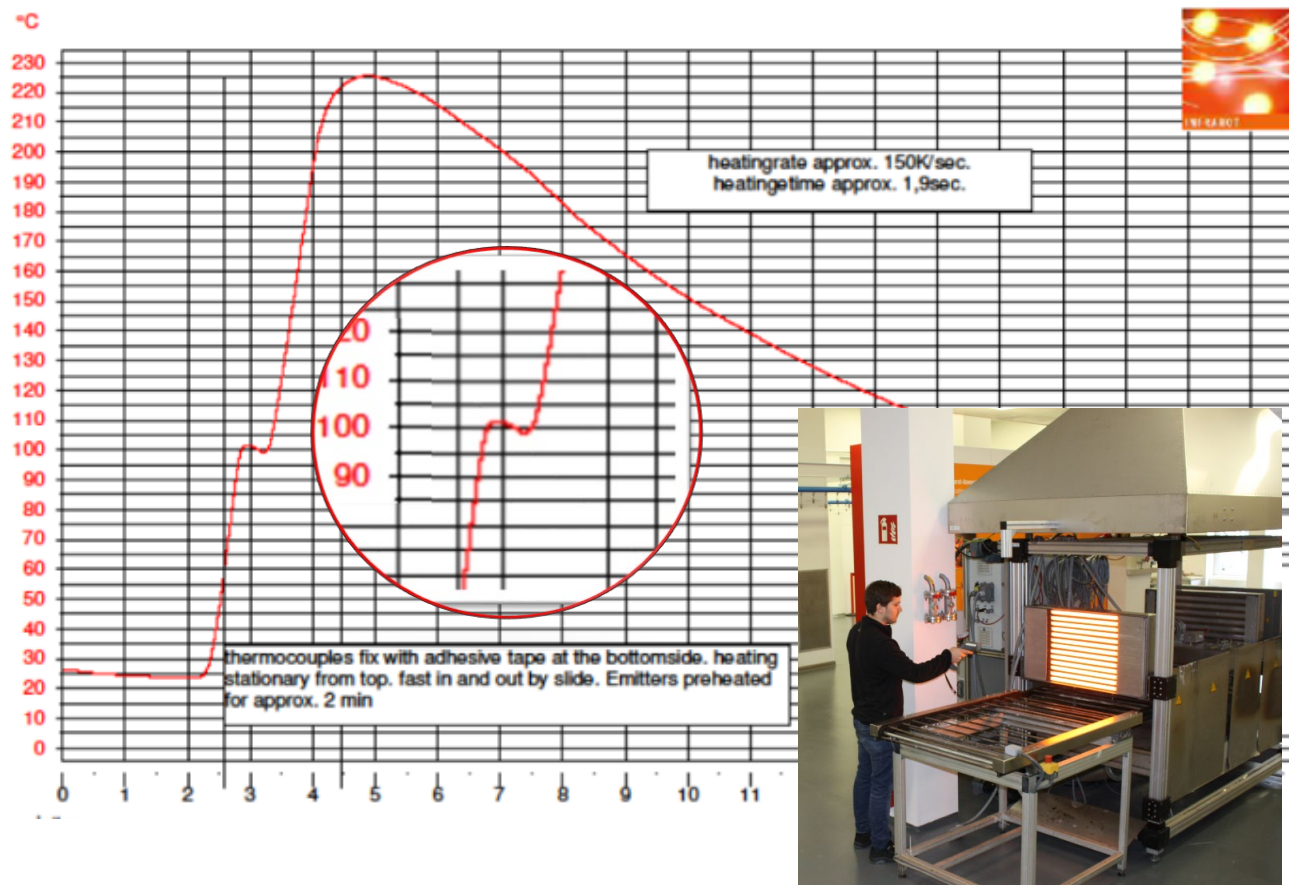




WHAT YOU SHOULD KEEP IN MIND

It might be worthwhile to consider a combination of efficient IR radiation and effective air-flow to increase production speed.

ANALYSIS OF HEATING RATE IN DEPENDENCY TO WAVELENGTHS



THE HERAEUS TEST CENTER

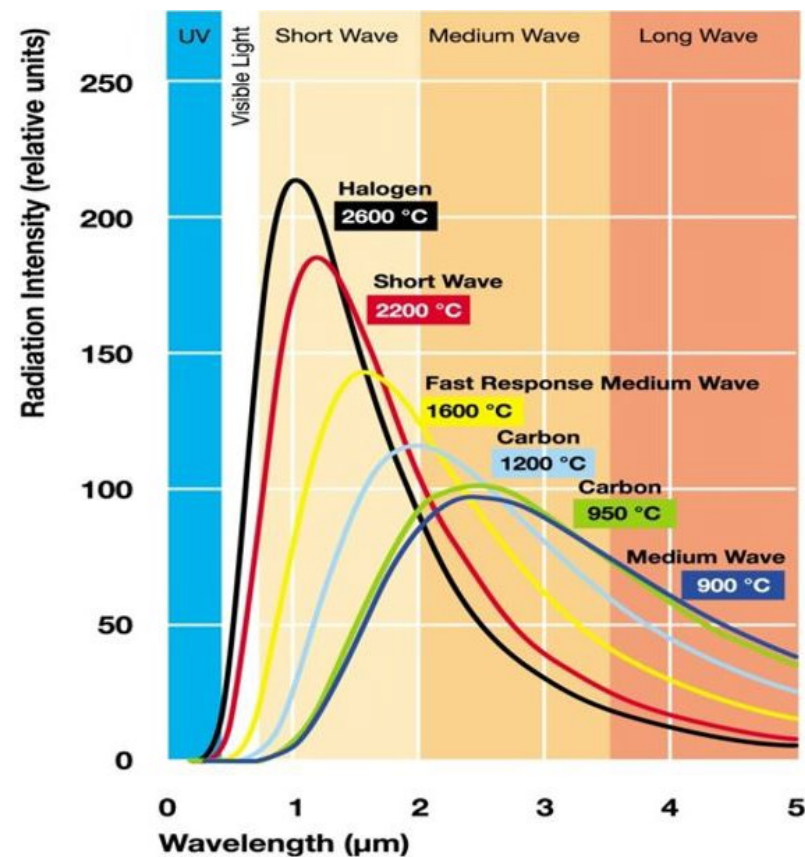
We carry out customer-specific applications in our application center and offer practical and optimized solutions.

- › Tests with electrical IR emitters and gas catalytic IR panels in a continuous furnace, as well as with UV lamps
- › Mobile rental infrared modules with control units for tests at the customer's site
- › Support from experienced Heraeus engineers
- › Database with more than 3000 test reports
- › Worldwide application centers

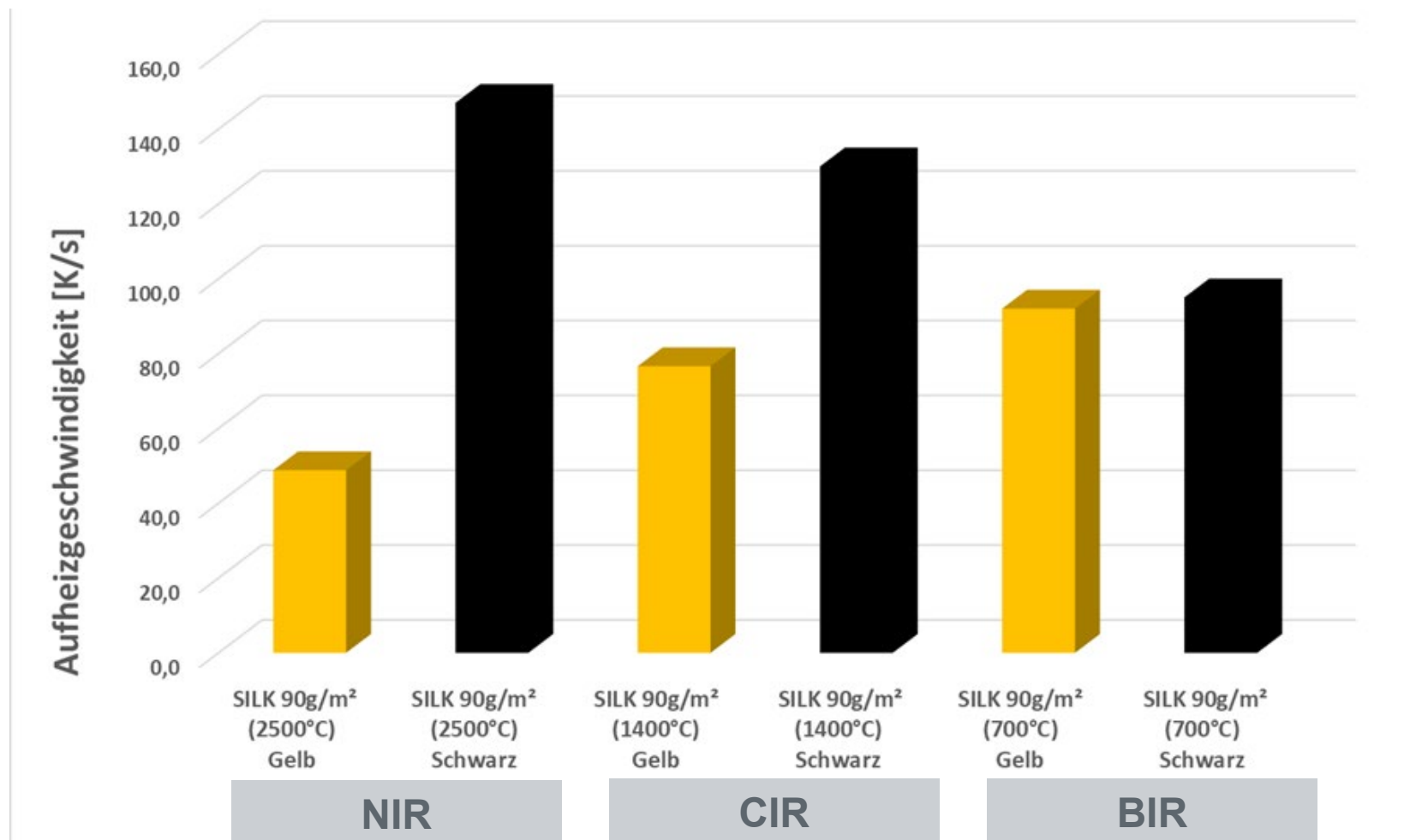


INFLUENCING FACTORS FOR IR HEATING

- › Distance between emitter and object
- › Spectral distribution
- › Material pigmentation
- › Layer thickness (e.g. adhesives, coatings)
- › Thermal conductivity of the object
- › Wall thickness of the object
- › Angle of impact



ANALYSIS OF HEATING-RATE IN DEPENDENCY TO WAVELENGTHS



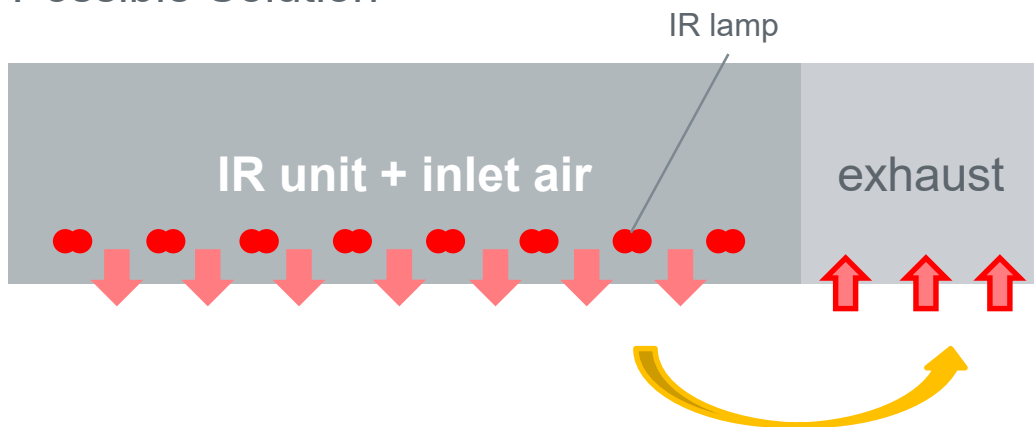


AGENDA

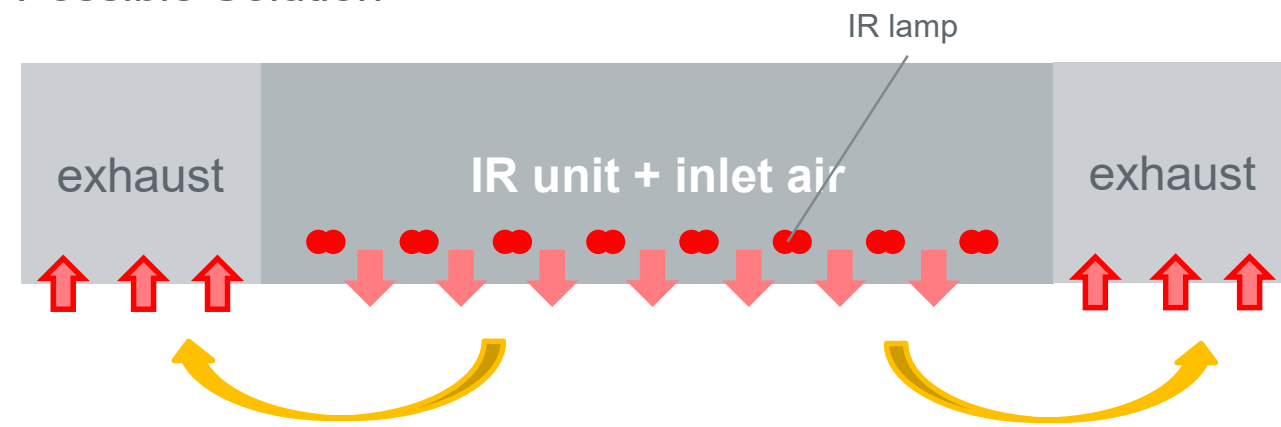
- ▶ Influence wavelengths
- ▶ Principles IR systems
- ▶ Benefits of fluid dynamics
- ▶ Challenges of drying processes
- ▶ Q&A session

STANDARD SOLUTIONS IN THE MARKET

Possible Solution



Possible Solution



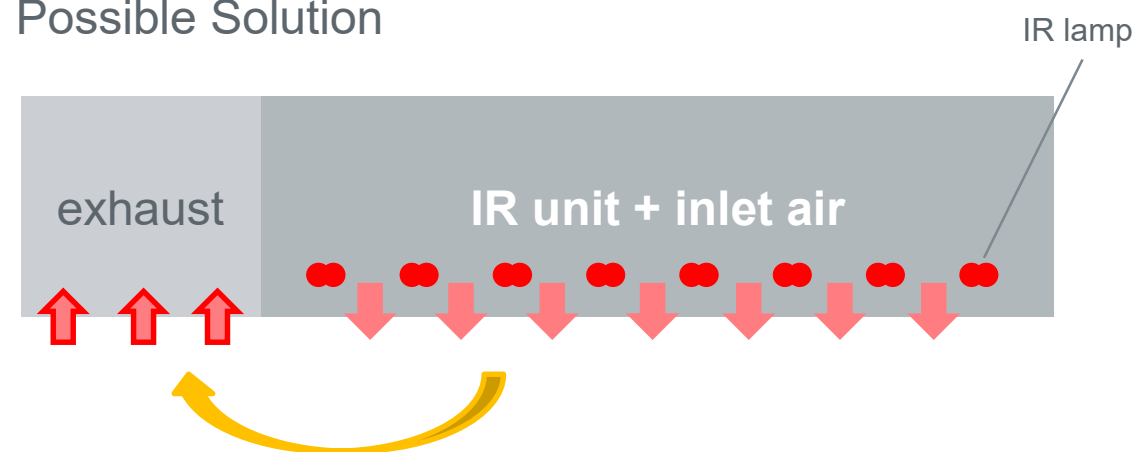
Substrate and web direction

STANDARD SOLUTIONS IN THE MARKET

Possible Solution

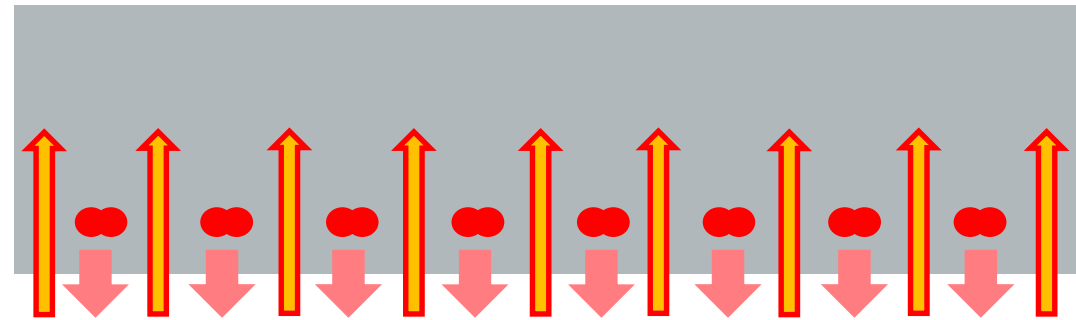


Possible Solution

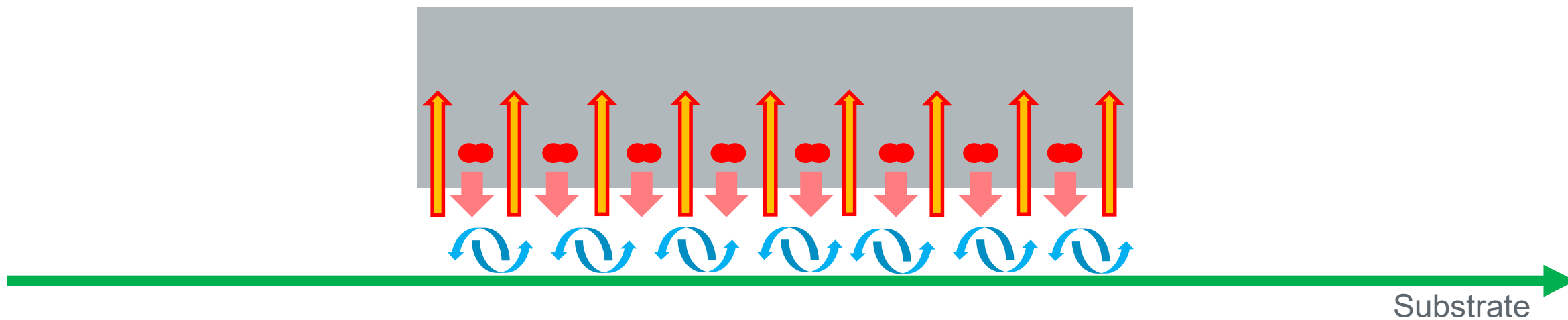


Substrate and web direction

IR MODULE WITH INTEGRATED EXHAUST

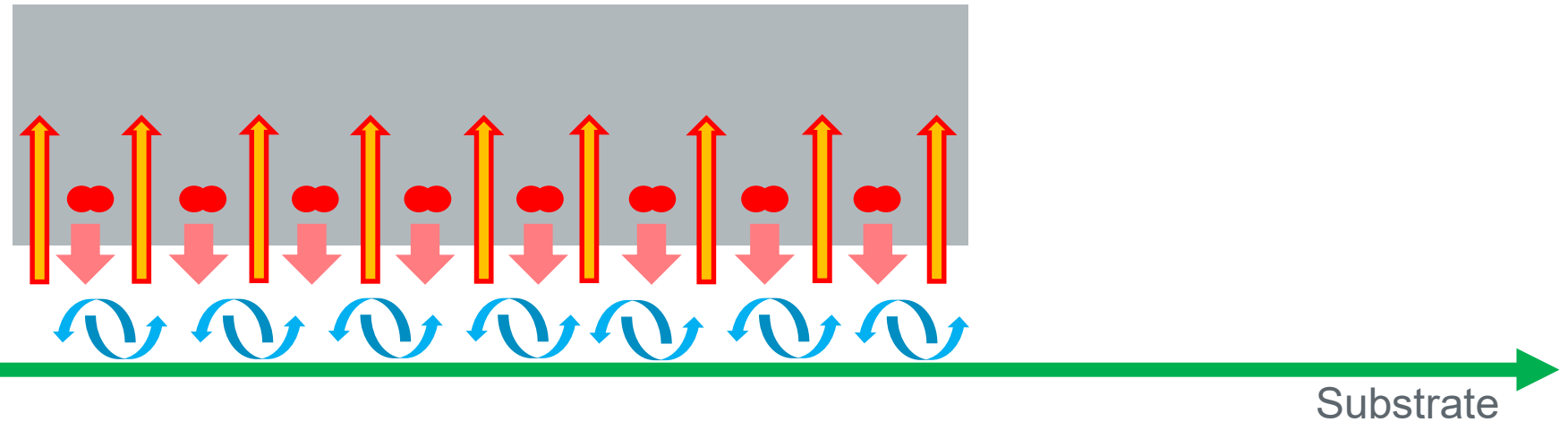


IR MODULE WITH INTEGRATED EXHAUST



IR MODULE WITH INTEGRATED EXHAUST

1. Take out the moisture where the process happen.
2. Burst the boundary layer of static and dynamic air



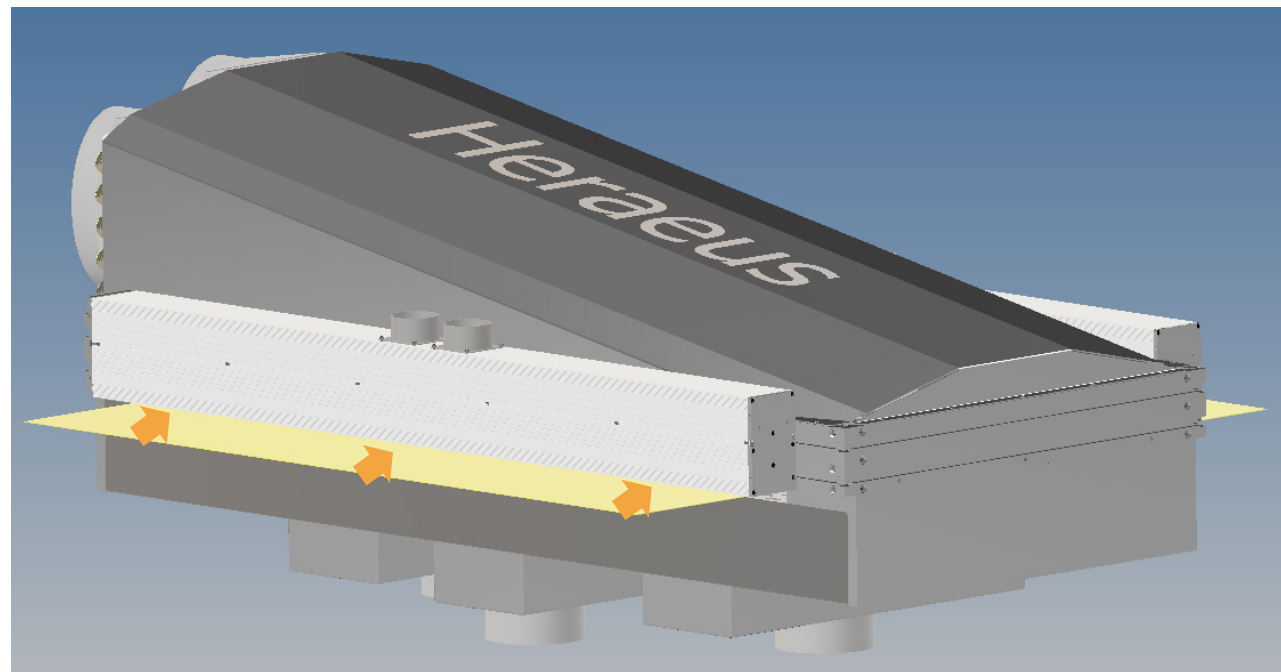
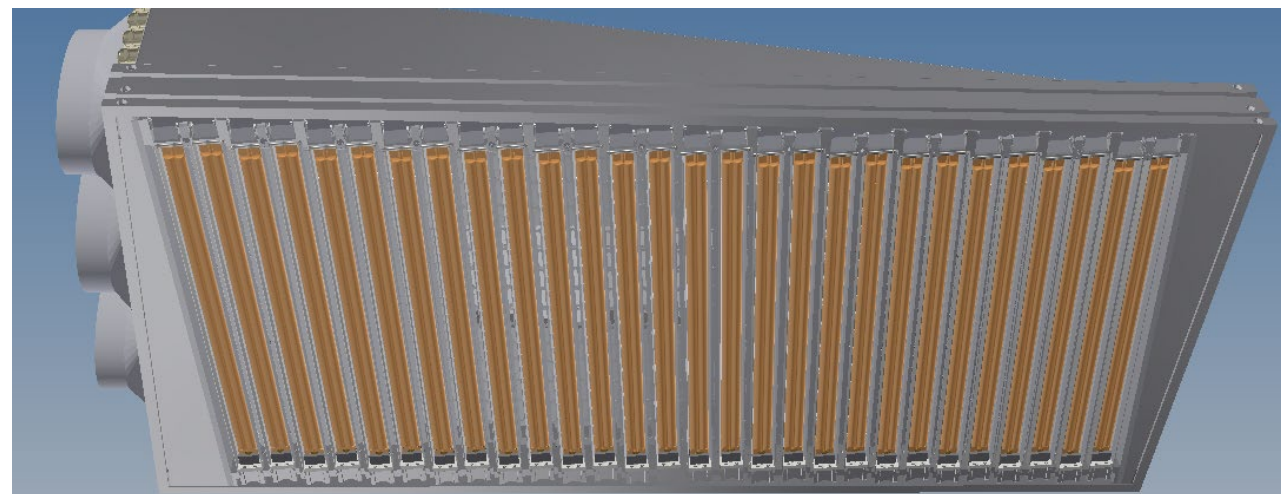


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INFRADRY *combi*

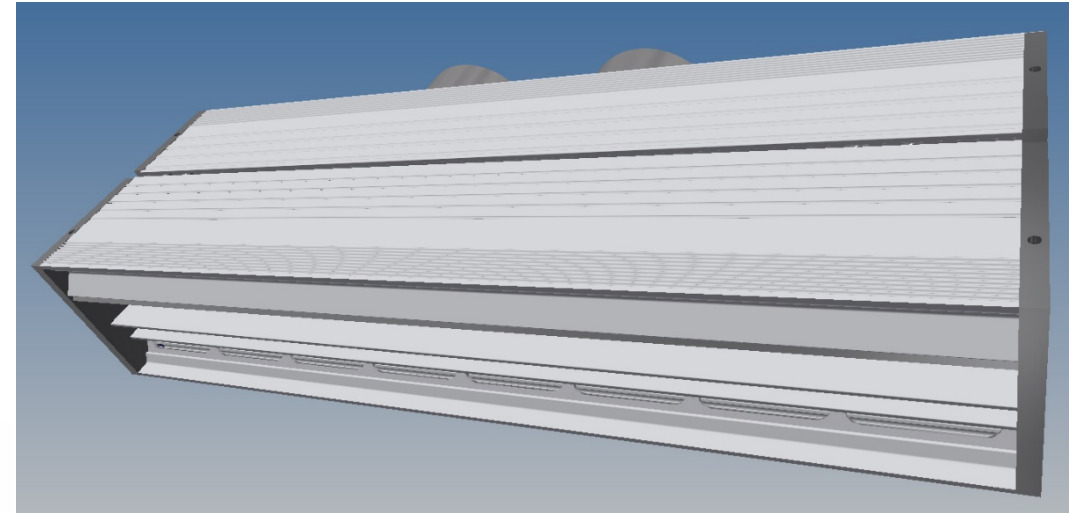
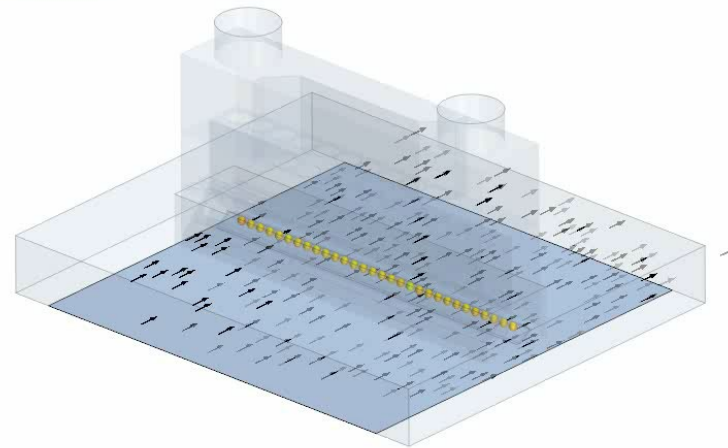
- › Modular construction system
- › **Infrared-field with integrated air-management**
- › Easy & quick lamp exchange
- › Backside-reflector for closed process-chamber
- › Variability of wavelength: NIR to CIR
- › Automatic-mode by temperature control
- › Adaptable to customer needs



AIR-SHOWER – THERMAL BARRIER & CLOSED PROCESS CHAMBERS

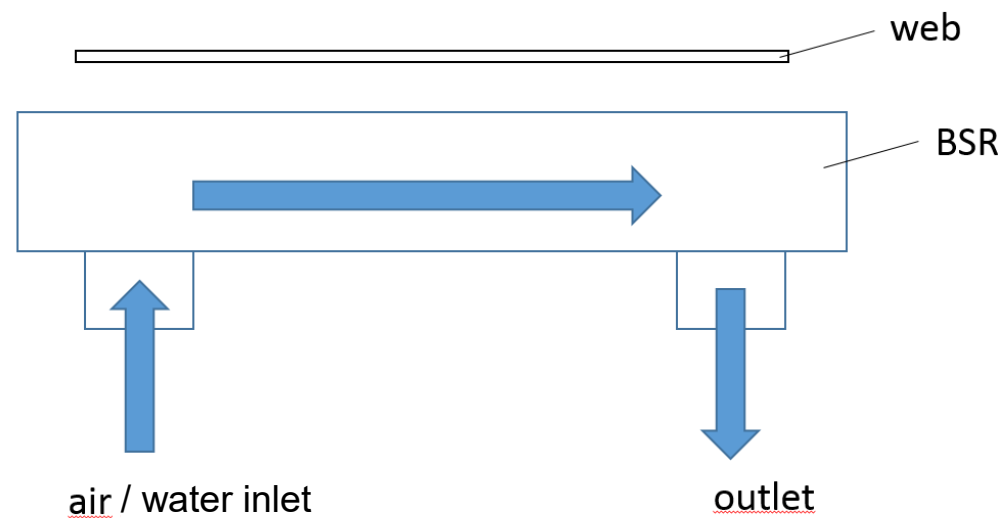
- › Air-floating & suction in one small unit
- › Useable as airknife or air-shower
- › Avoid thermal contact to print engine
- › Hot-air drying solution
- › Adjustable air-knife opening
- › Easy to connect

STAR-CCM+



TYPES OF BACKSIDE REFLECTOR AND BENEFITS

Standard solution in the market





Agenda

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WHAT WE WANT TO AVOID

Drying of printing products – what we want to improve:

- › Moisture, products still wet
- › Overheating, burning, browned paper

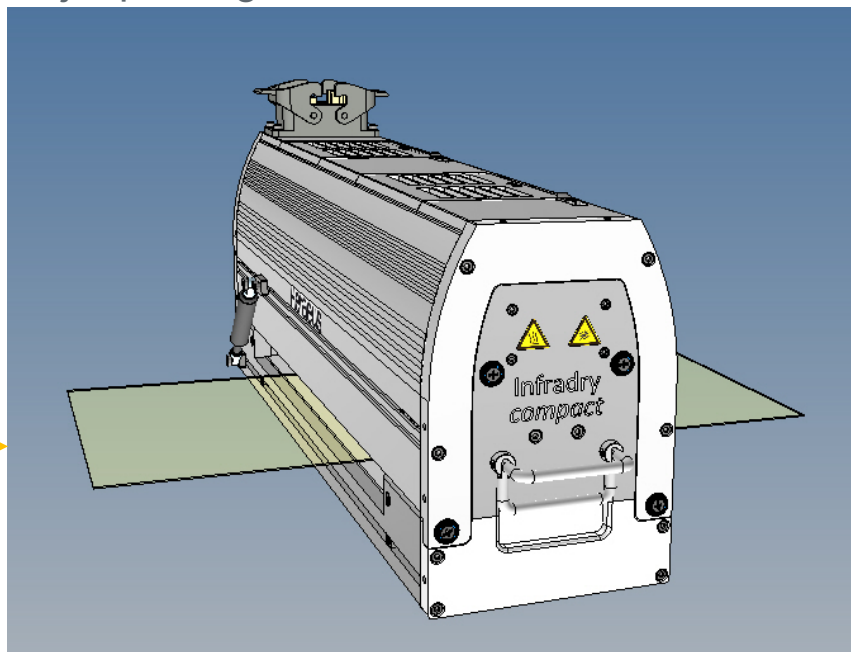
Causes

- › Quality loss
- › Low production speed
- › Uncontrolled processes
- › Drying is the bottle neck of the production
- › Energy losses

...can get improved by exactly matching Infrared dryers!

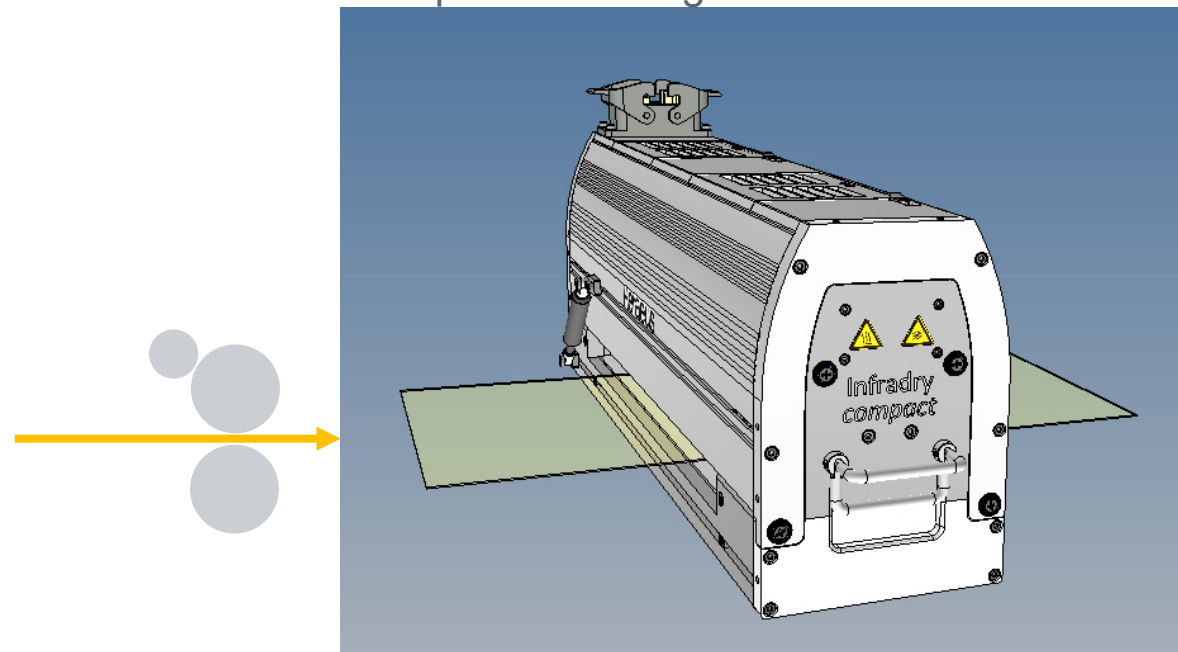
FLEXIBLE PACKAGING & EXACTLY MATCHING WAVELENGTHS

inkjet printing



NIR application

transparent coating



CIR application

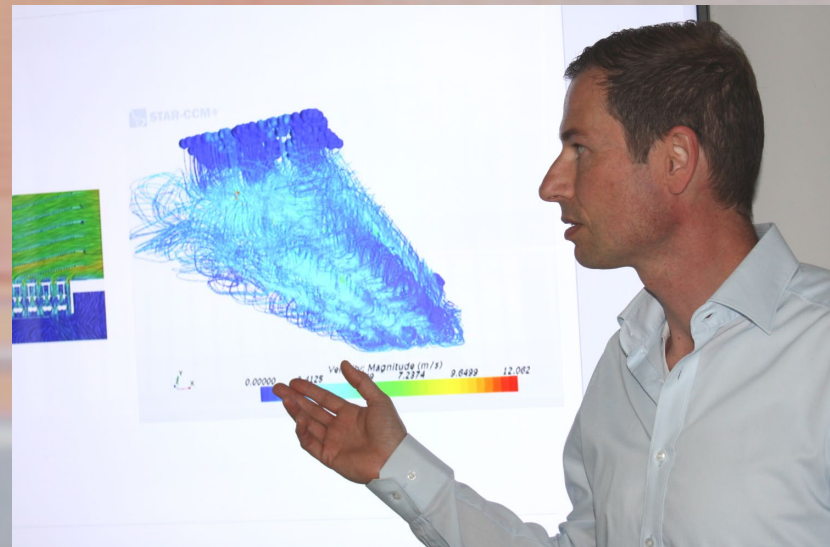


SUMMARY

- ▶ IR wavelengths have a huge influence in different applications
- ▶ IR drying gets much more efficient, if the exhaust is integrated exactly where the process is happening
- ▶ Measurement systems enable knowledge transfer for drying
- ▶ Drying processes can be challenging and need exact adjustment to customers needs

Q&A session

Vincent Krafft





Many thanks for your participation.

more details...

contact

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