

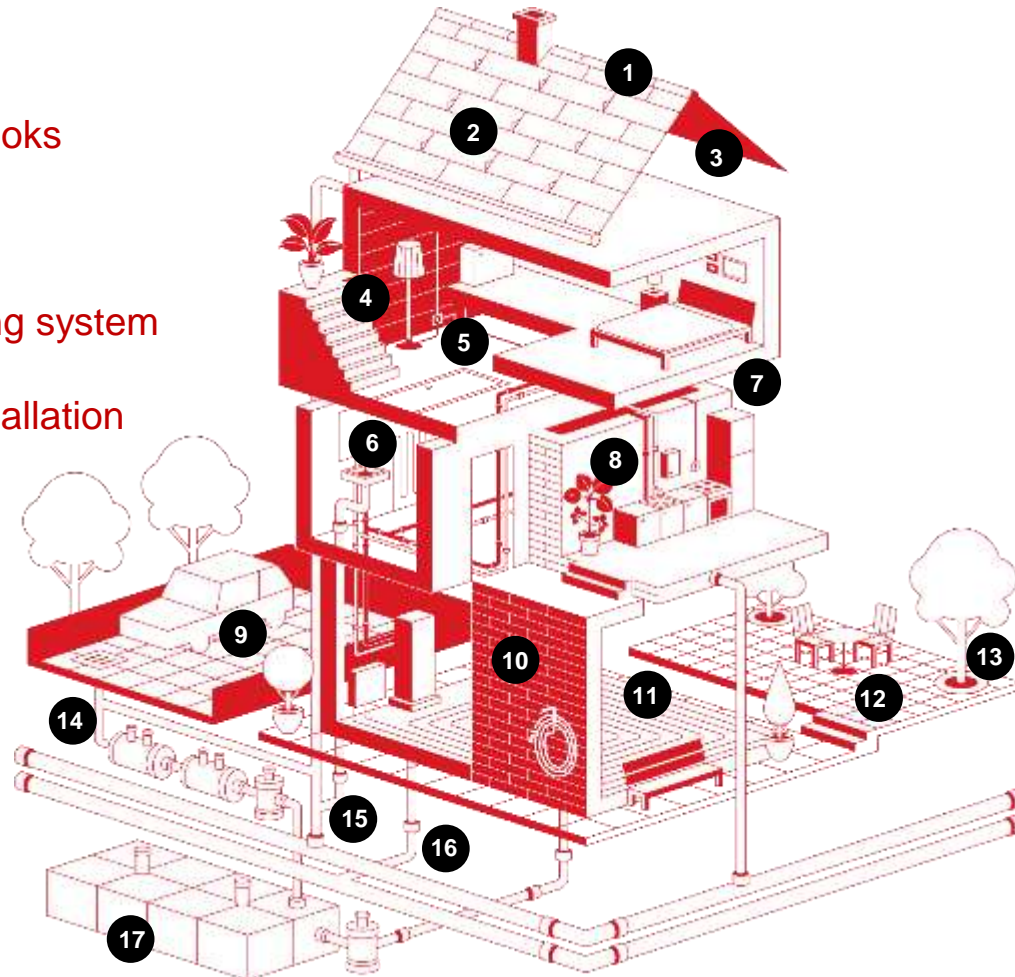


NEFI Technology Talk: Brick Drying

Stefan Puskas, Oct. 2023

Wienerberger System Solutions

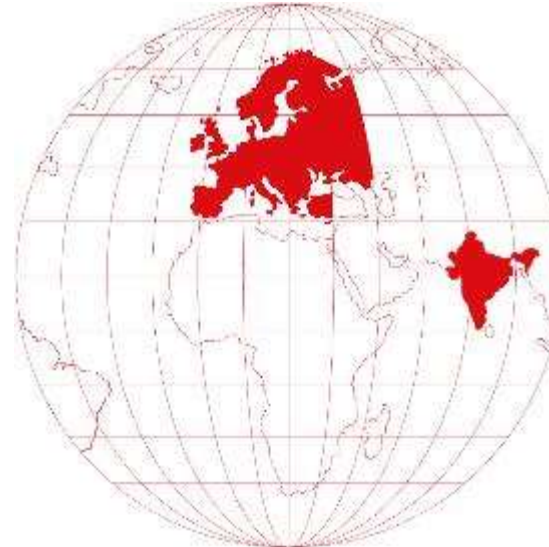
- 1 Ceramic accessories
- 2 Roof tiles with snow hooks
- 3 Roof underlay
- 4 Clay blocks
- 5 Electrical installations
- 6 Wall heating and cooling system
- 7 Ceiling cooling
- 8 Hot and cold-water installation
- 9 Concrete pavers
- 10 Facing bricks
- 11 Floor heating
- 12 Clay pavers
- 13 Landscaping elements
- 14 Water filtration unit
- 15 Wastewater
- 16 Fresh water supply
- 17 Raineo



1819: Birth of Wienerberger:

2022:
Employees
~ 18.500
Revenues
€ 5.00 billion

WB Building Solutions & WB Piping Solutions



Products & production sites

Clay blocks: 62
Facing bricks: 38
Roof systems: 31
Pavers: 20
Plastic and ceramic pipes: 33
Digital products and solutions: 2

North America



Products & production sites

Facing bricks: 24
Concrete products: 2
Plastic pipes: 1
Calcium silicate brick: 2

Brick making 1/2

1. Raw material (clay pit, excavation, preparation, storing)



Pan grinder



Roller mills



Souring plant

2. Shaping (extrusion, pressing, machine hand moulded)



Brick making 2/2

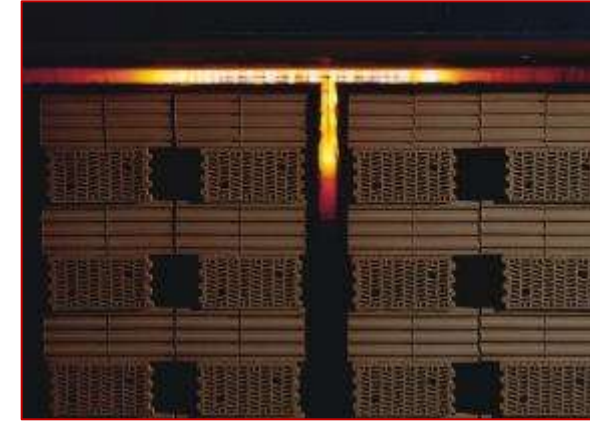
3. Drying (22 - 30%_{dry} -> ~2%_{dry})

Typical: 1.500 – 5.000 kg_{H₂O}/h

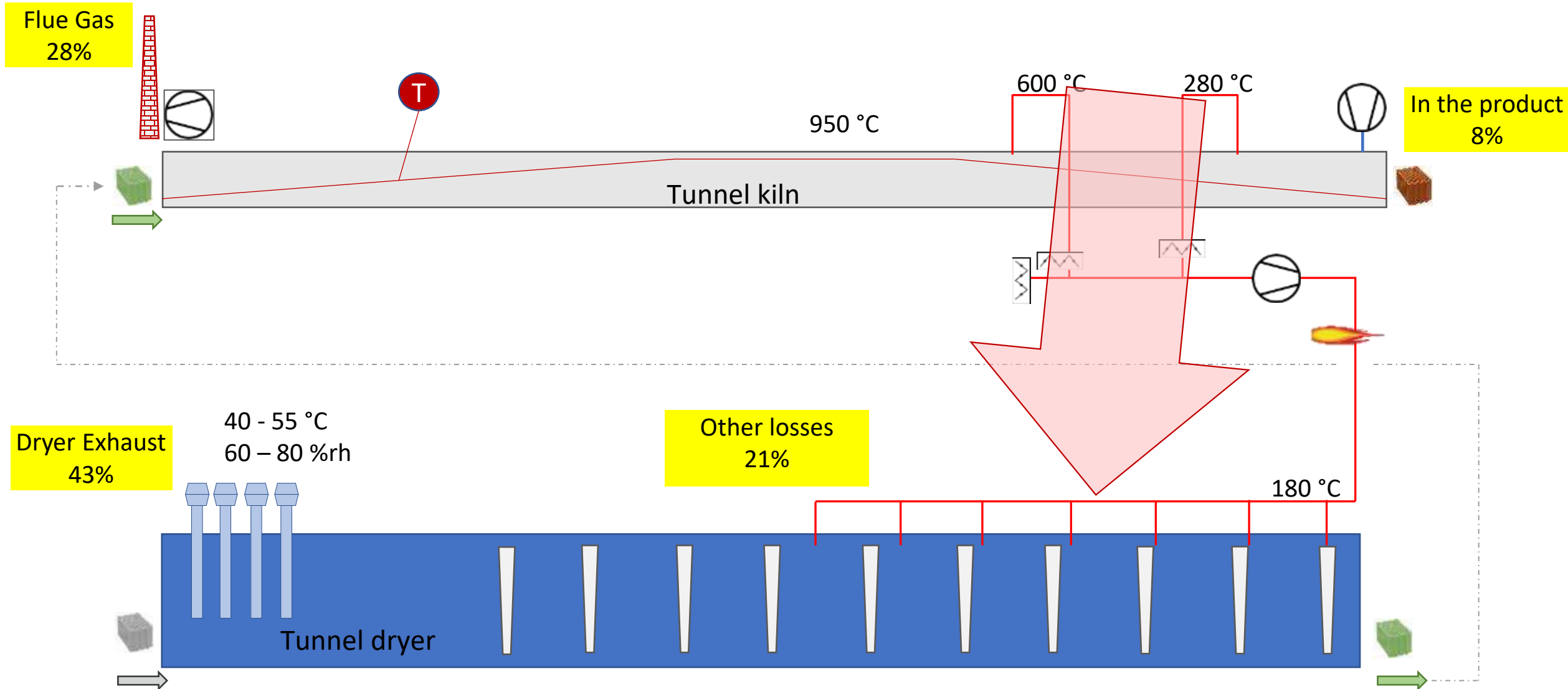


4. Firing (900 – 1.100 °C)

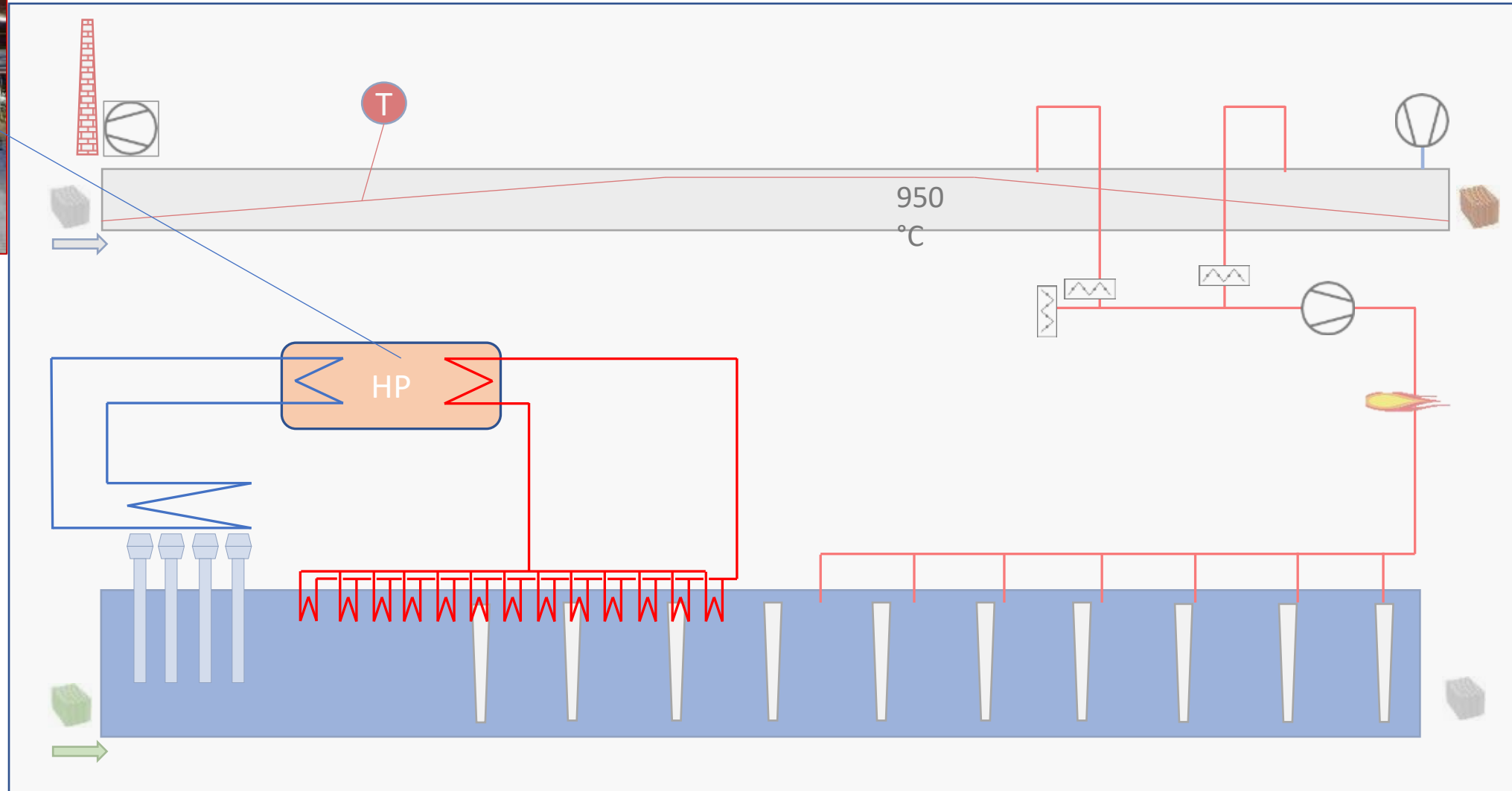
Typical: 100 – 500 to_{brick}/d



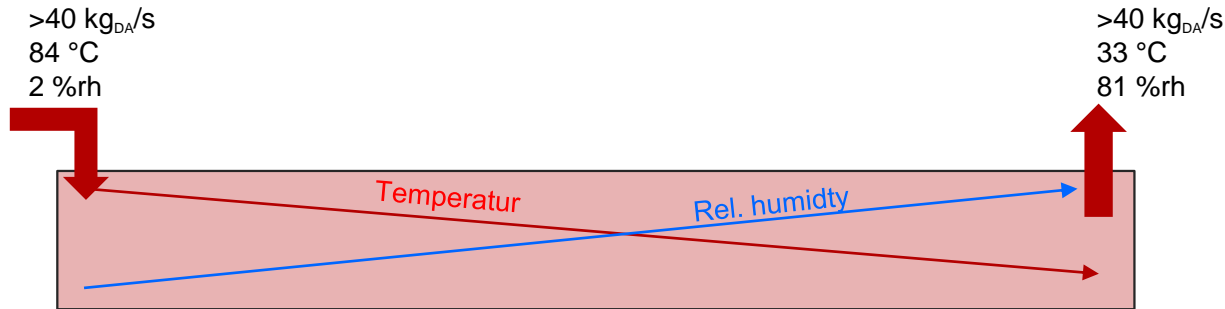
Energy Balance 1/2: Kiln-Dryer Coupling



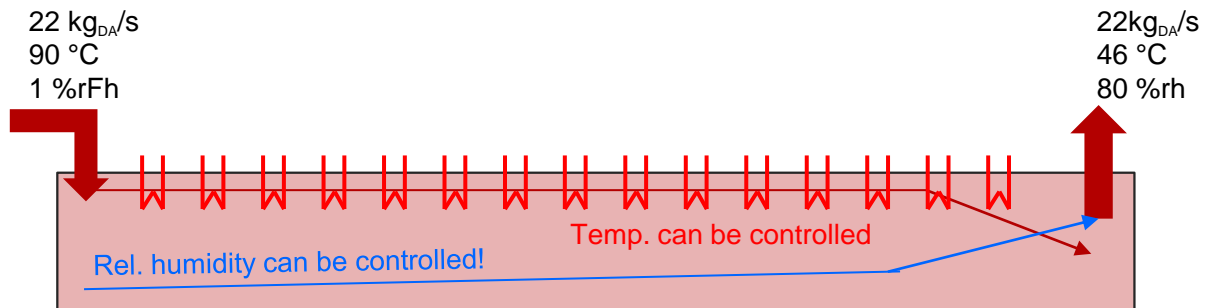
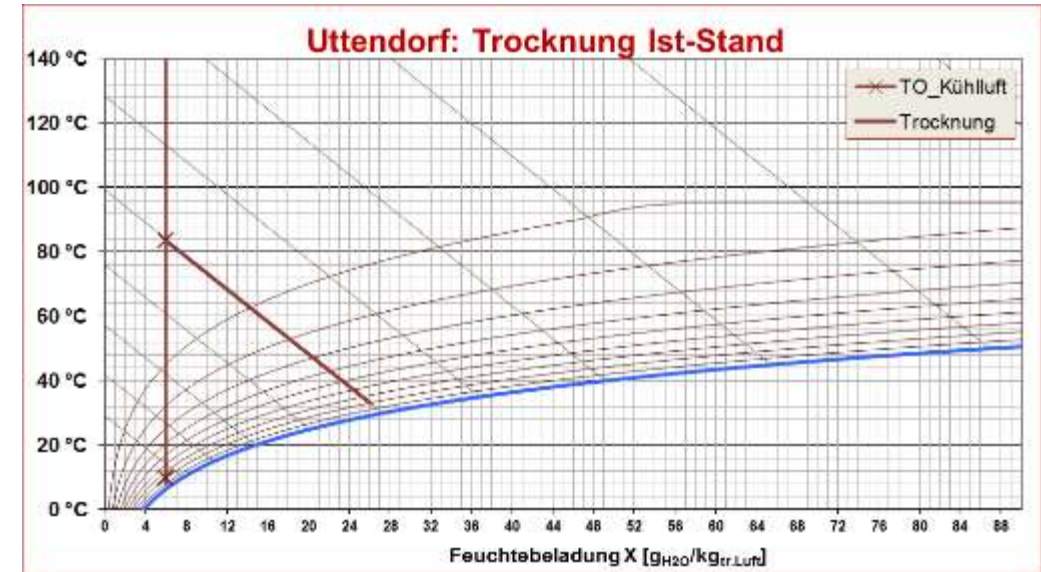
Latent Energy Recovery System (LERS)



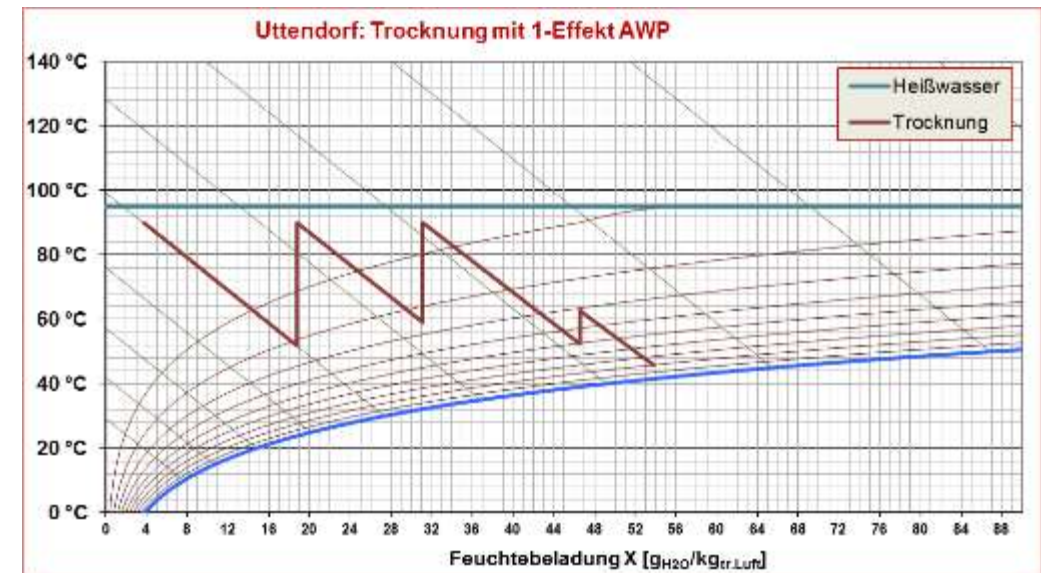
Dryer without and with HP



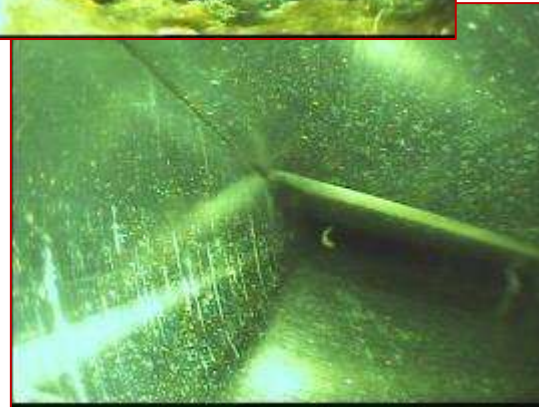
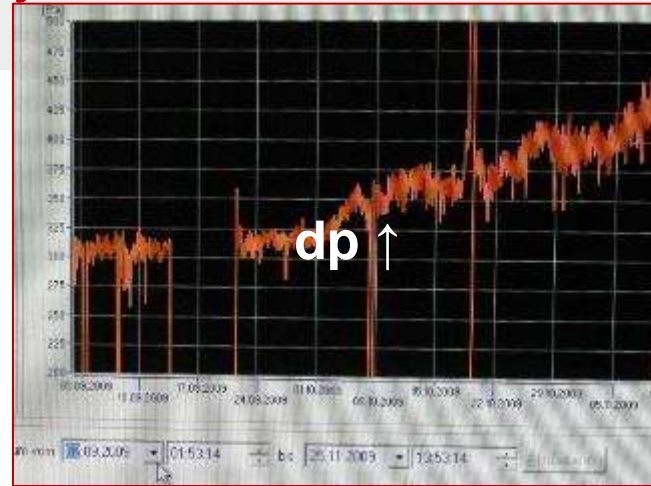
Tunnel dryer:
Only the supply air can be controlled (\dot{m} , T, rh)



Tunnel-dryer with HP:
The air demand of the dryer decreases significantly when inner heat sources are available. Additionally T and rh in the dryer can be controlled independently.



(Latent) Heat Recovery with HX: 1/2



Air / air HX: 5 mm plate spacing

(Latent) Heat Recovery with HX: 2/2



Microbiological examination

Classic heat exchangers appear unsuitable for brick dryers.

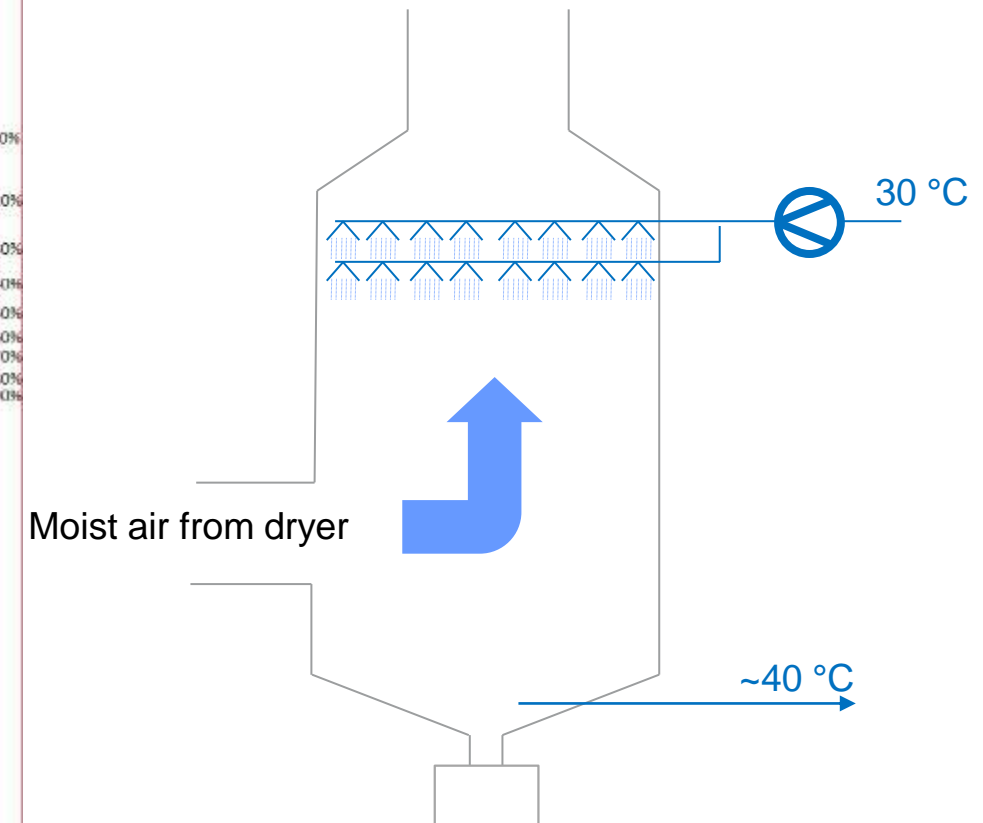
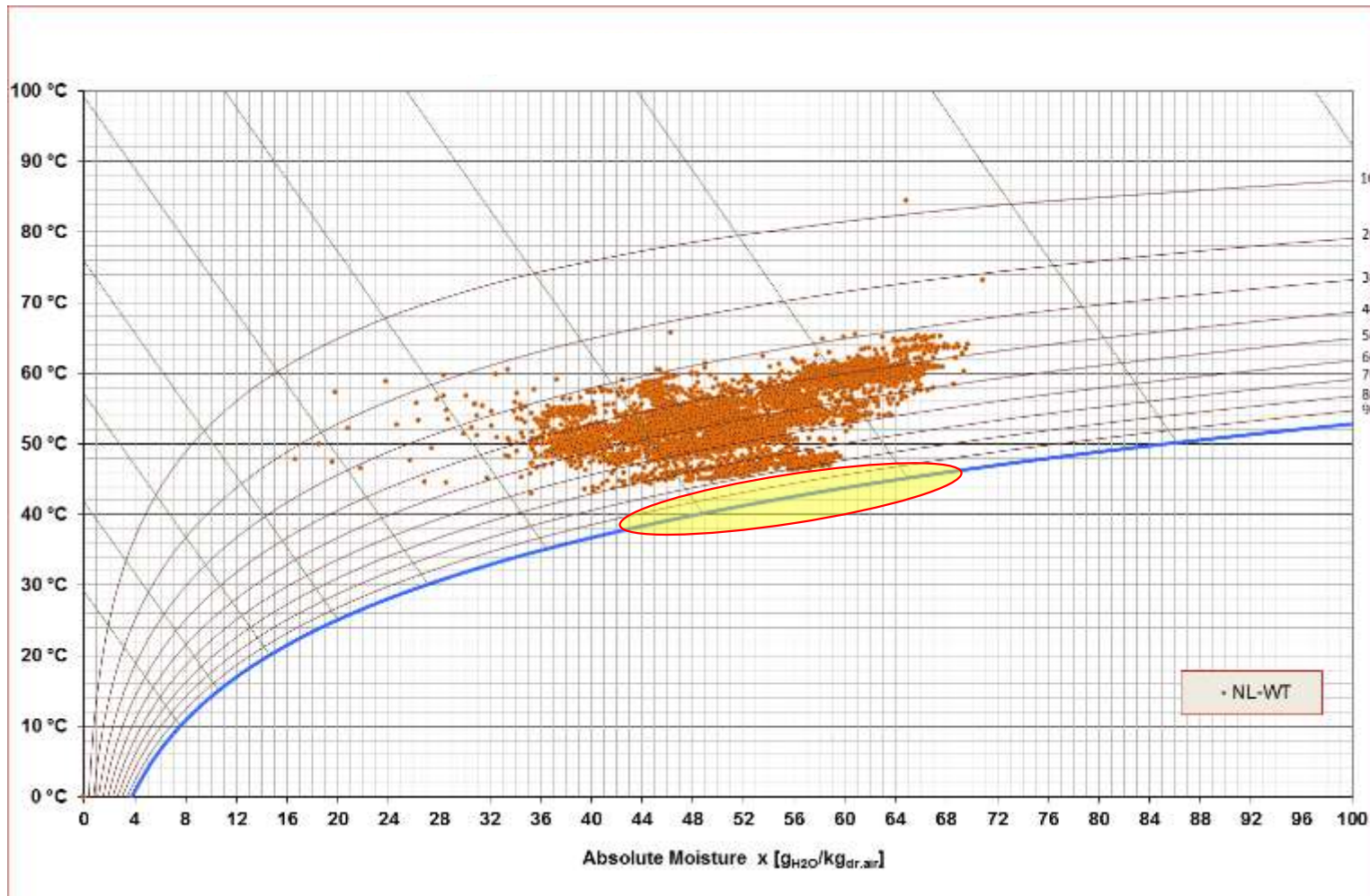


Aspergillus fumigatus ☹

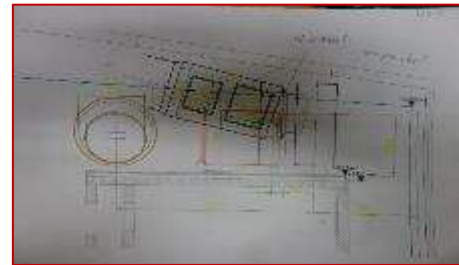
(Latent) Heat Recovery with Scrubber: 1/2



(Latent) Heat Recovery with Scrubber: 2/2



Heat Sink: Water/Air HX



Heat Pump experiences (a.o.):

DryPump



powered by



DRYficiency



powered by

RESEARCH & INNOVATION



LEERS-HAI



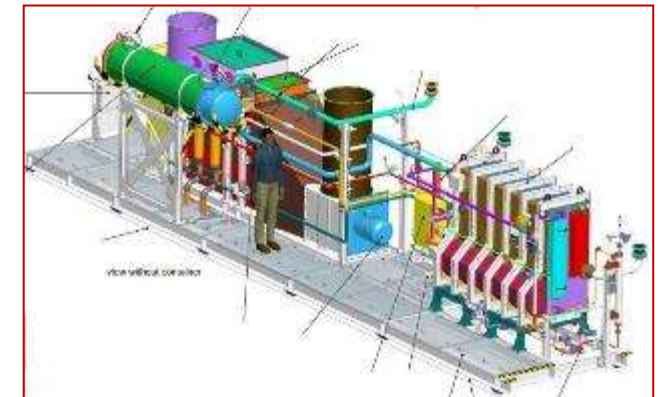
powered by
KPC



Screw-compressor

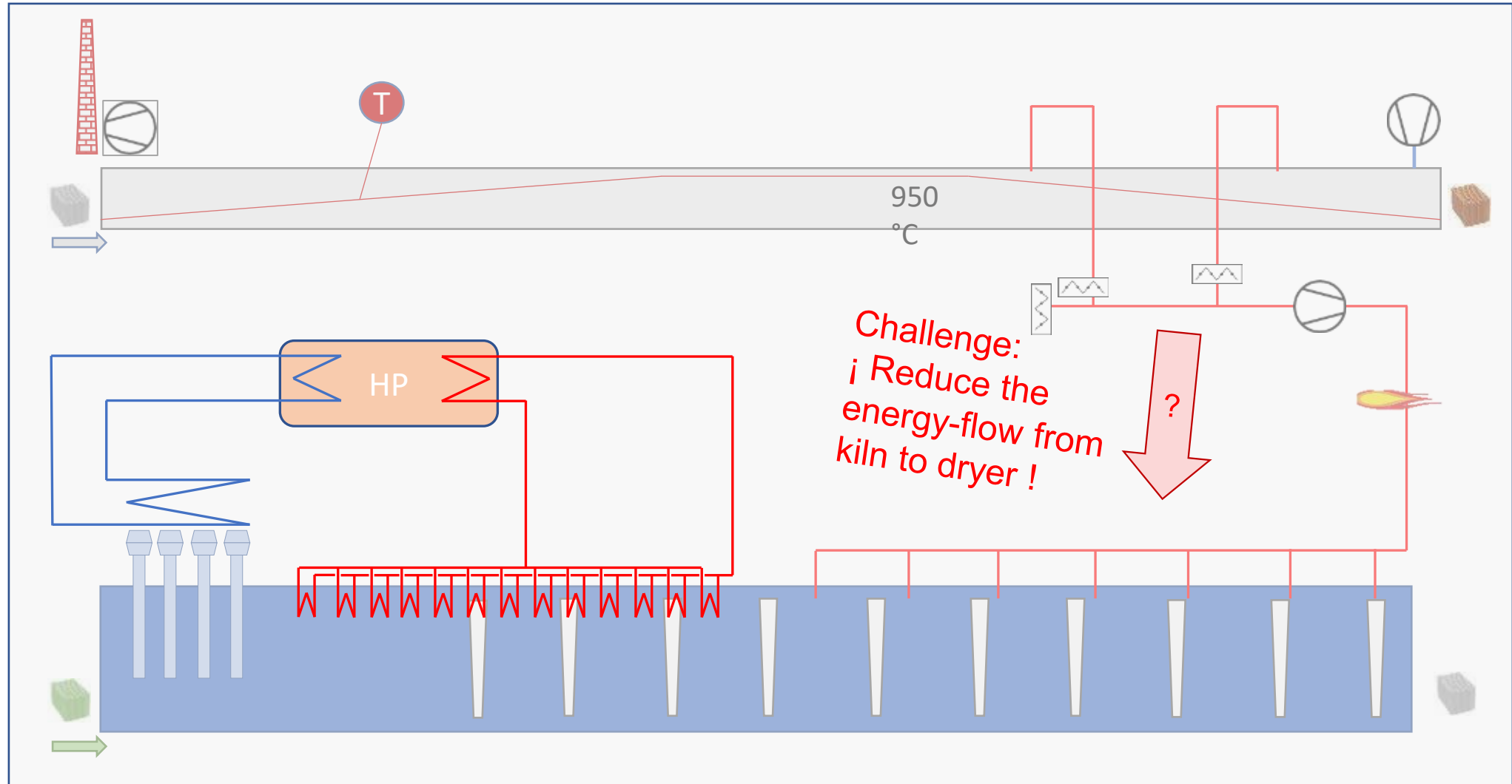


Piston-compressor



Single stage LiBr/H₂O Absorption

What is a big challenge?



Thank you for your attention!



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