

Quality Requirements of Machinery for Convective Heat Treatment of Technical Textiles & Nonwovens

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Your Strong and Reliable Partner

- **Company founded in 1949** by Kurt Brückner, father of today's CEO Regina Brückner
- **60 years of experience in thermal treatment of textiles**
- **100 % Family Owned** and managed business by Regina Brückner and her husband Axel Pieper with the support of a strong and professional management team.
- **Reliable and Future Oriented Partner**
- **Management Philosophy**
 - technical / technological market leadership
 - systems solution provider
 - sustainable business success
 - organic growth
- **More than 5.000 machines installed all over the world**



BRÜCKNER technologies – Product Overview

**Dry Finishing Machinery
for Knitted Fabrics**

**Coating Plants for
Technical Textiles/Nonwovens**

**Dry Finishing Machinery
for Woven Fabrics**

Glass Fibre Finishing Plants

**Heat Recovery and
Air purification Systems**

**Bonding and Finishing Plants
for Nonwovens**

**Carpet Dyeing and
Back Coating Plants**

Special Purpose Machinery



Final Application of Technical Textiles

personal care and hygiene

clothing

home

school & office

building

industrial

filtration liquid, air & gas

wipes

medical

geotextiles

leisure & travel

furnishings

automotives

agriculture



Need of Thermal Treatment for the Production Process

nonwovens bonding

mechanical

- entangling

thermal

- thermofusion
- calendering
- welding

chemical

- impregnating
- spraying
- foaming

finishing processes

- dyeing
- printing
- coating
- kiss coating
- heat-setting
- curing
- finishing
- flocking
- laminating



Dependency of the Product quality on the Equipment

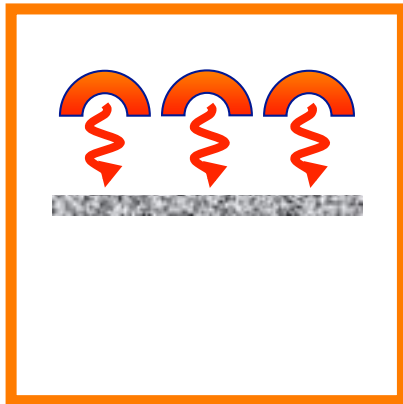


Thermal Treatment of Technical Textiles & Nonwovens

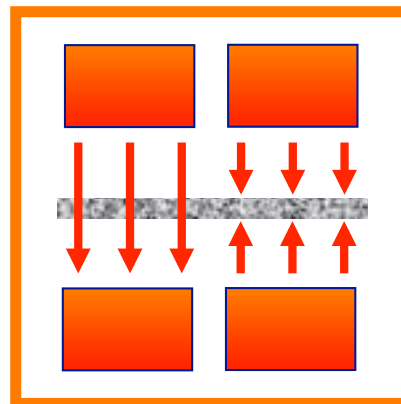


Possibilities of Heat Transfer

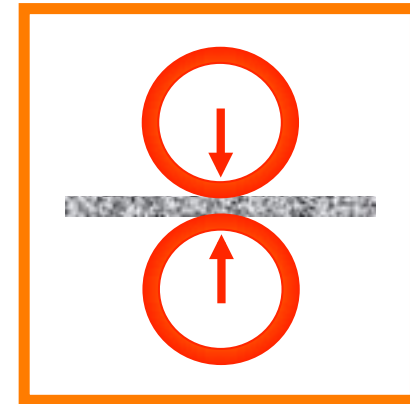
radiation



convection



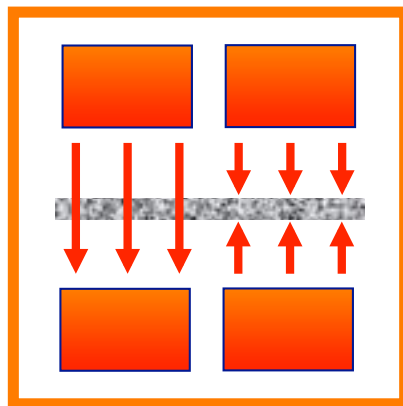
contact





convection machines

convection



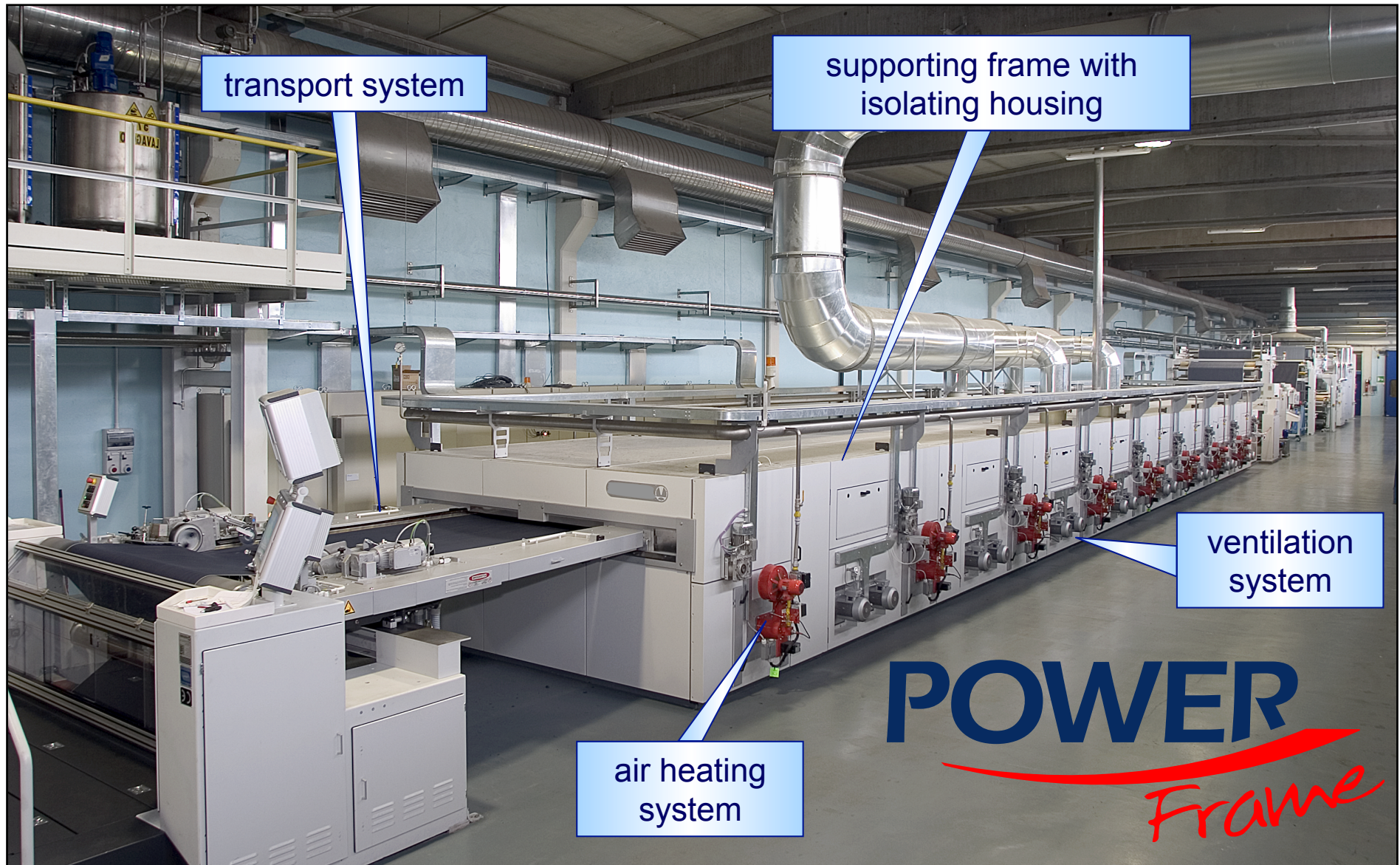
composition

- support frame with isolating housing
- heating system for the hot circulating air
- ventilation system for the hot circulating air
- transport system for the material web

examples

- stenter
- belt oven
- drum dryer
- hotflue
- floatation dryer



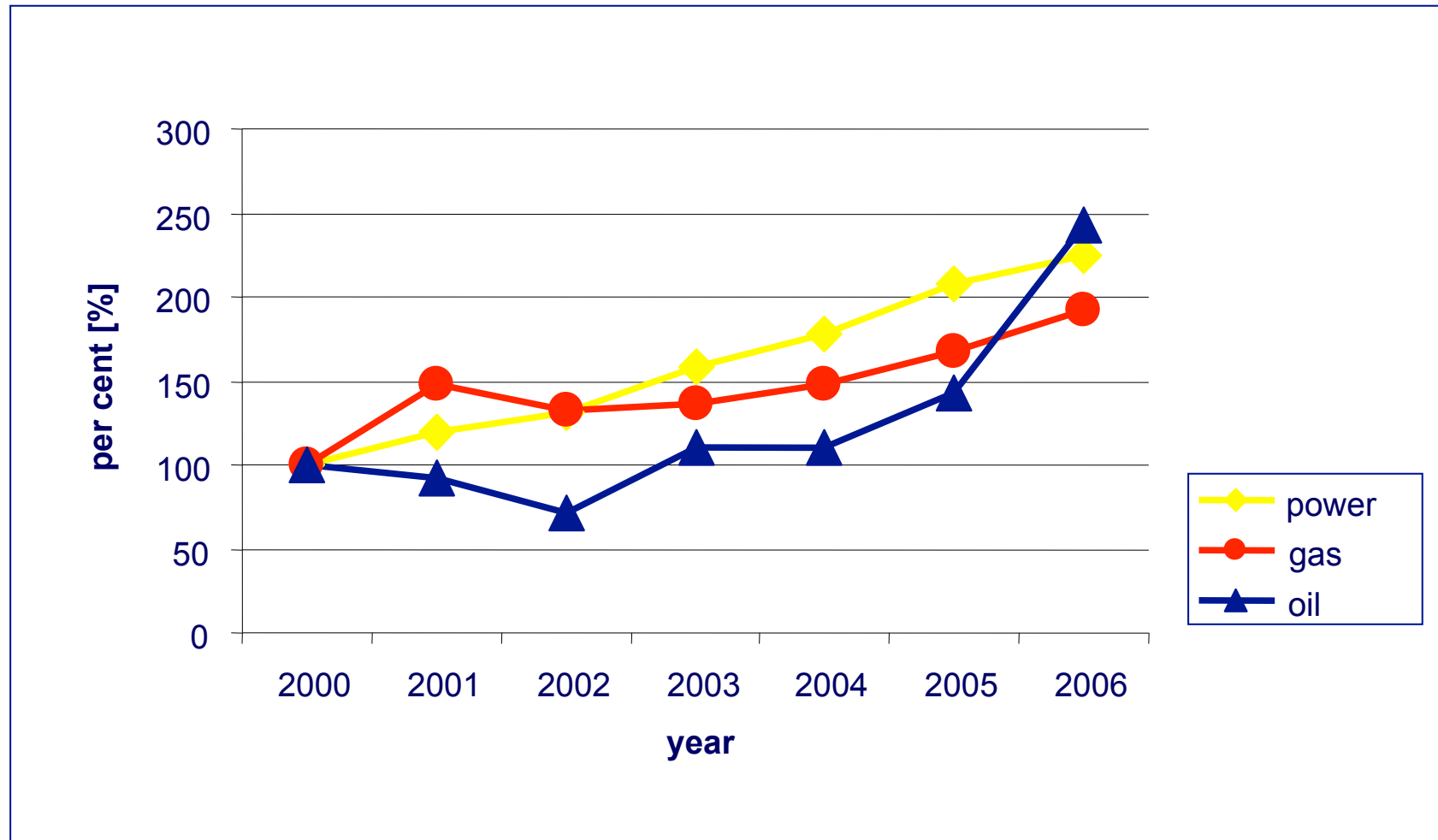


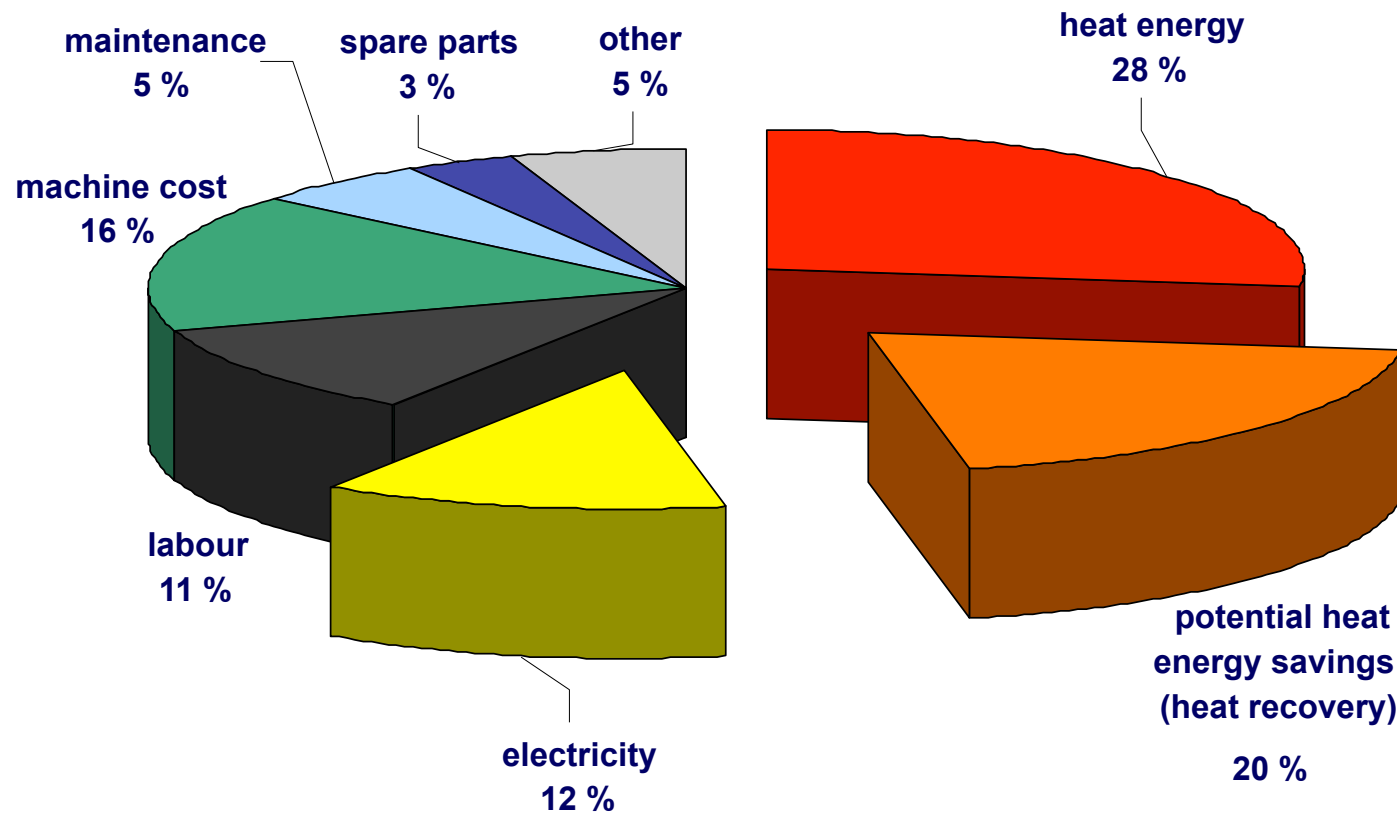
Attributes of Modern Convective Systems

- uniform temperature
- uniform air-flow
- efficiency
- high suitability
- increase of quality



Development of Energy Costs 2000-2006





conclusions of cost analysis:

- energy costs = 48 % (heat energy) + 12 % (electricity)
= 60 % is the major cost factor
- 20 % of the heat energy costs can be saved with an air/air heat recovery

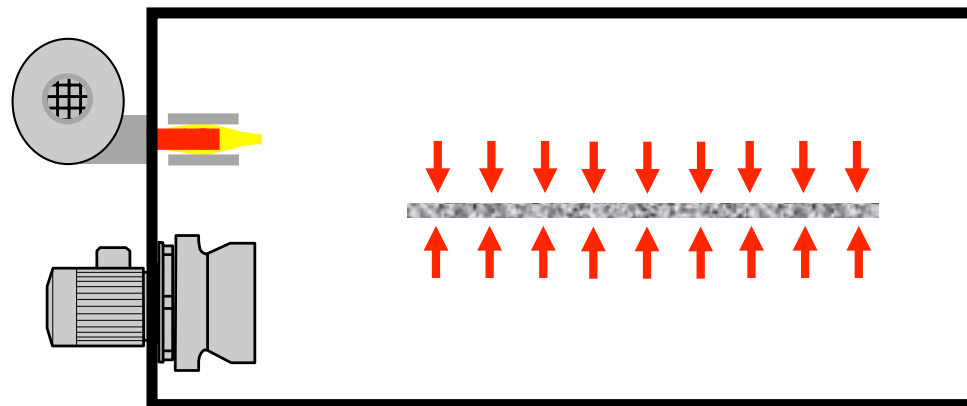
remark: data derived from cost analysis of a BRÜCKNER stenter over a 10 year period



Composition of Convective Machines

- heating system for the hot circulating air

- support frame with isolating housing



- ventilation system for the hot circulating air

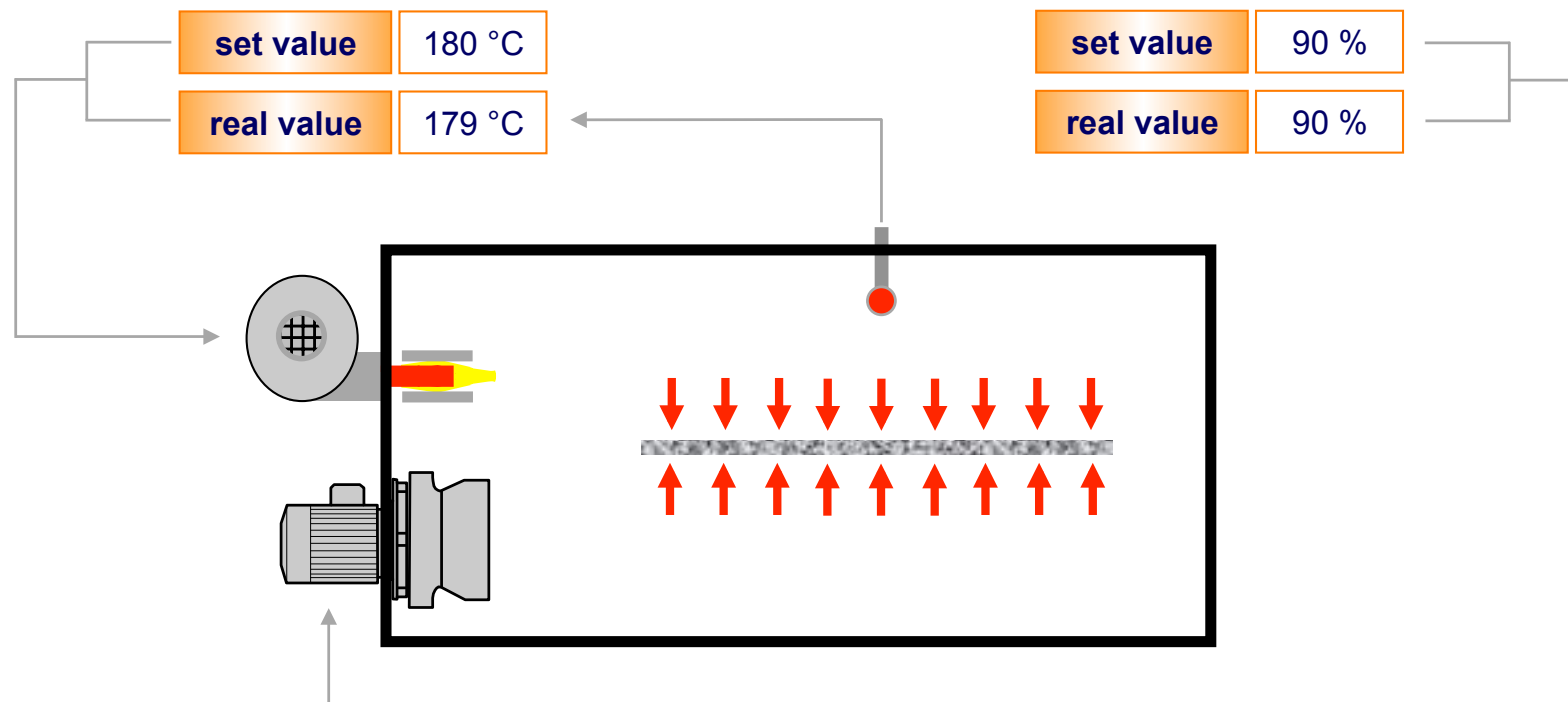
- transport system for the material web



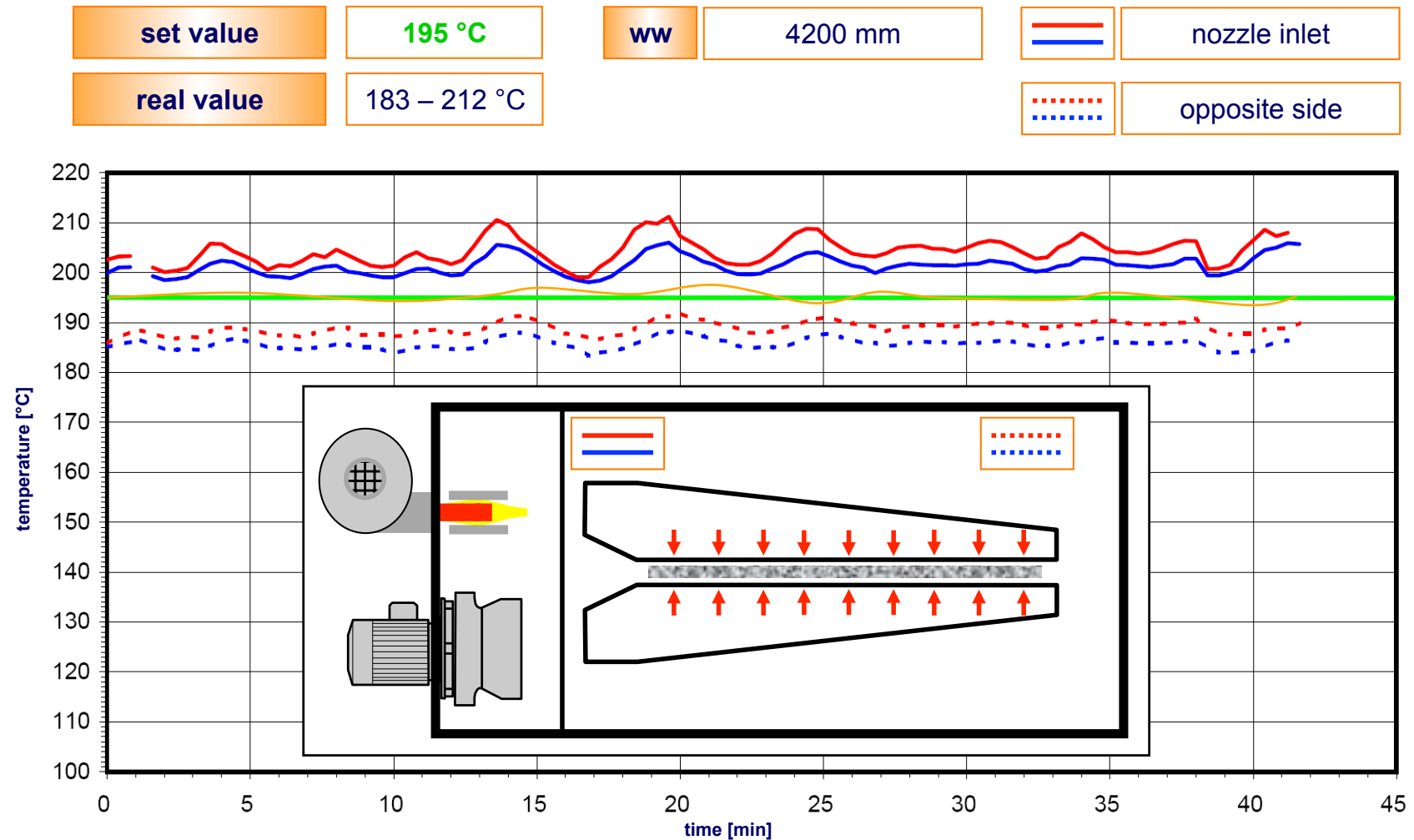
Important Process Parameter

distribution of temperature

distribution of air

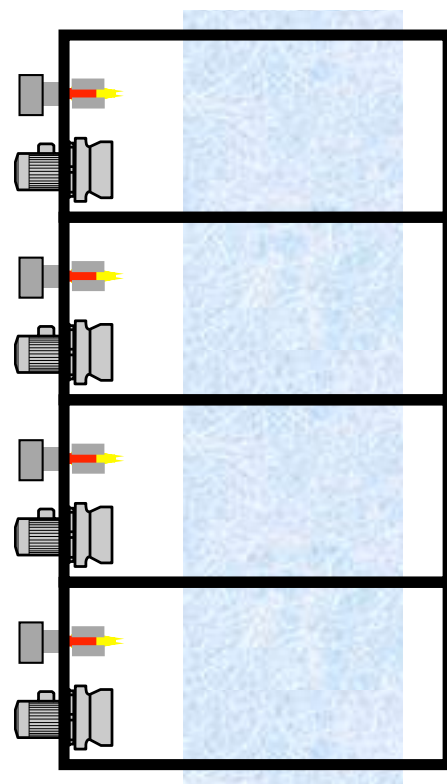


Example of Uneven Temperature Distribution

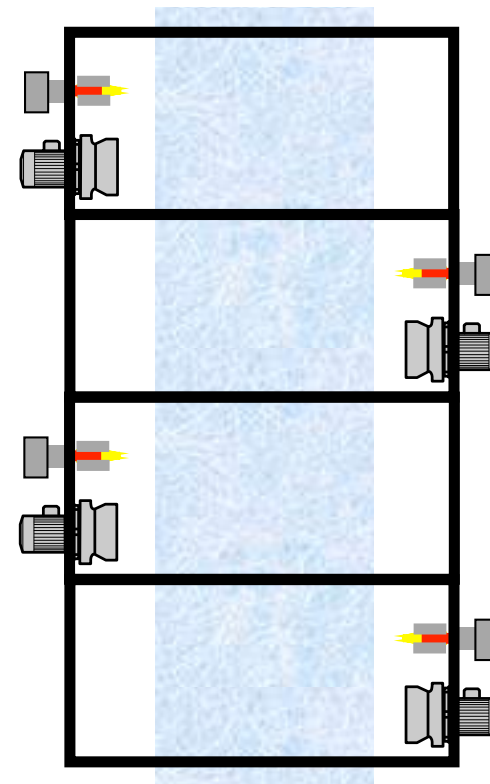


Higher Evenness by Use of Counter Arrangement Design

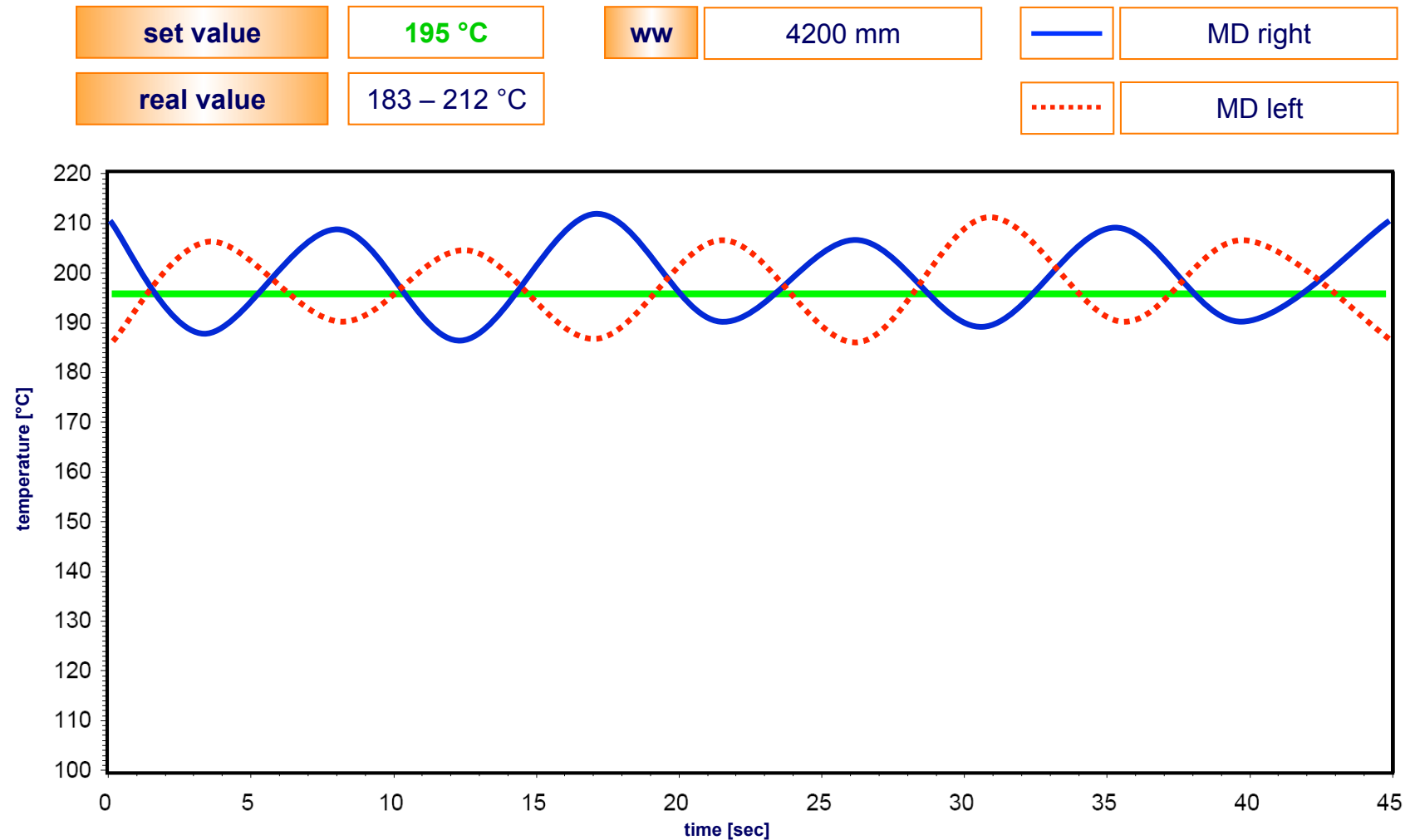
without



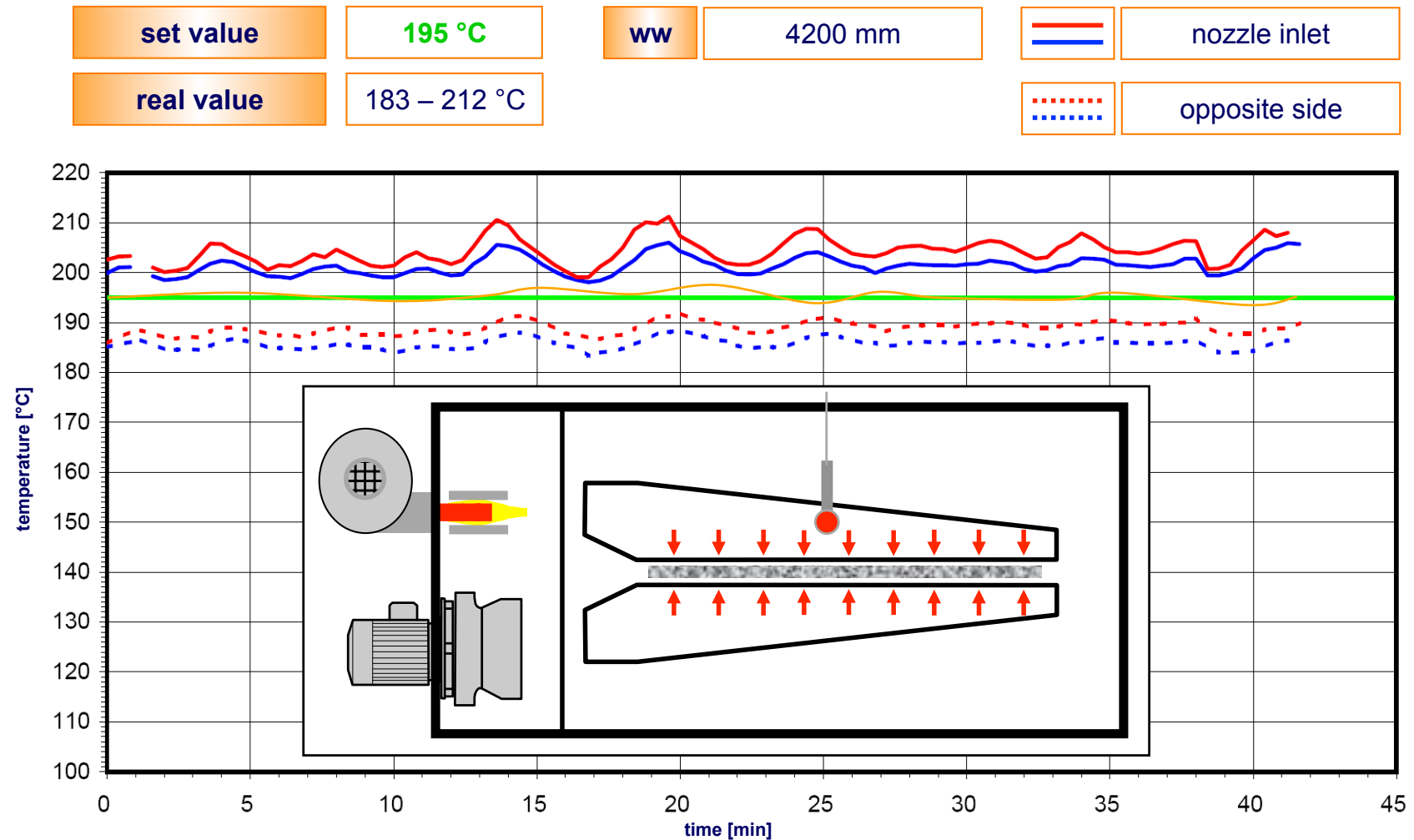
with



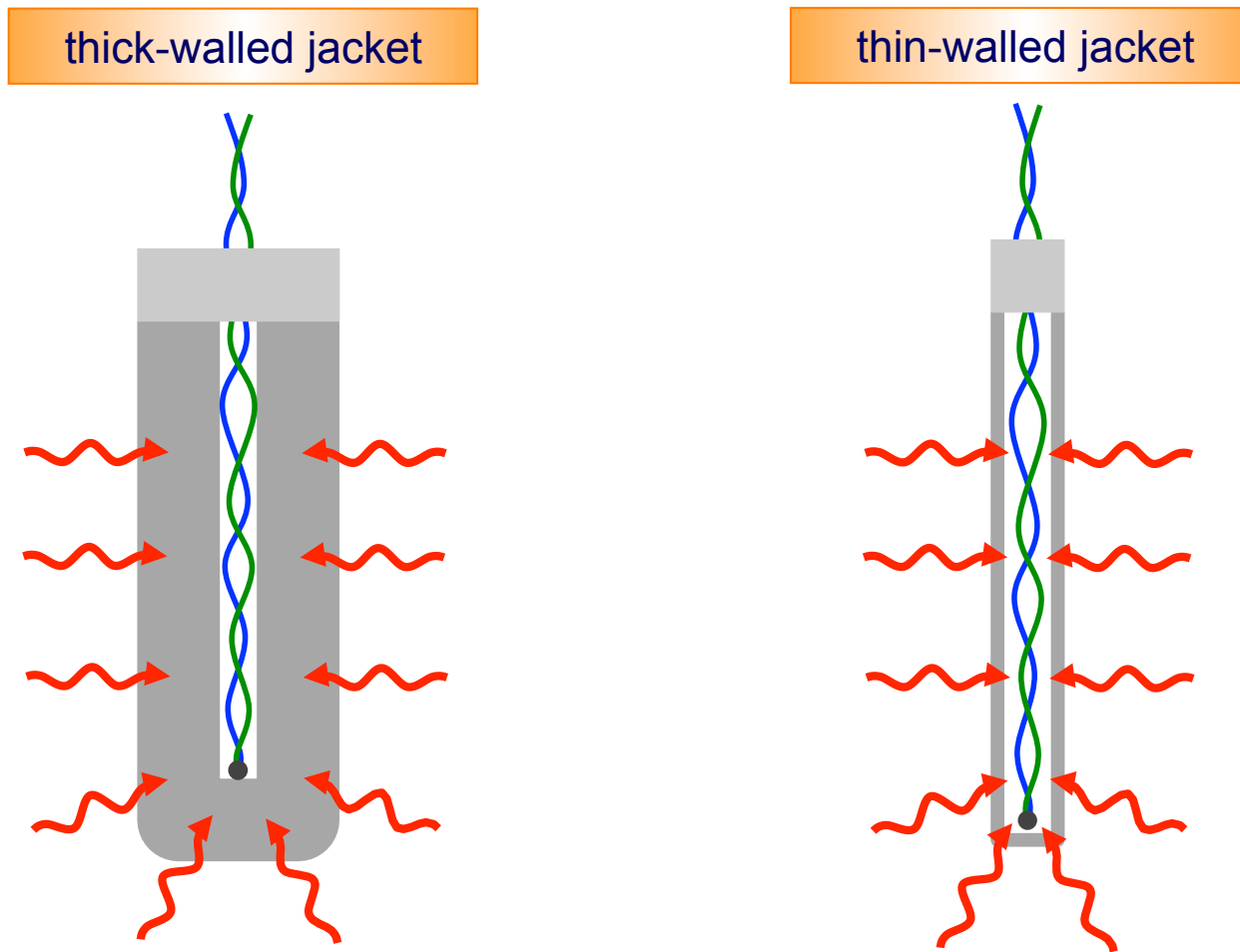
Attenuation by Counter Arrangement Design



Example of Volatile Temperature Level

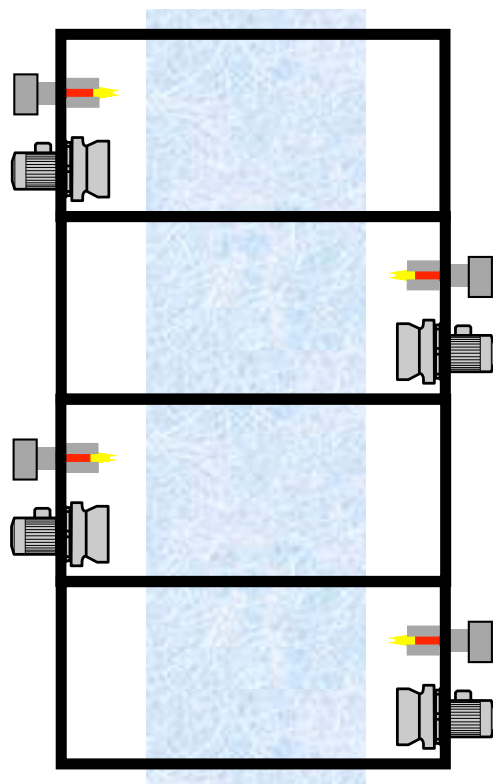


Influence of Temperature Sensor Pt100

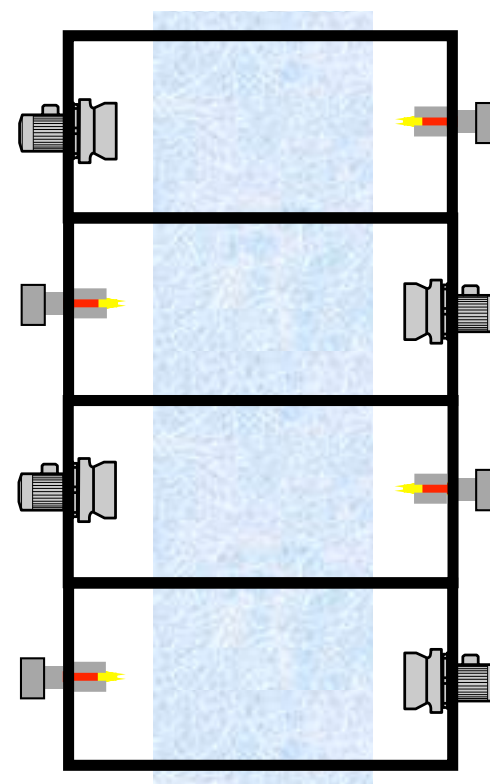


Optimized Arrangement of Heating and Air System

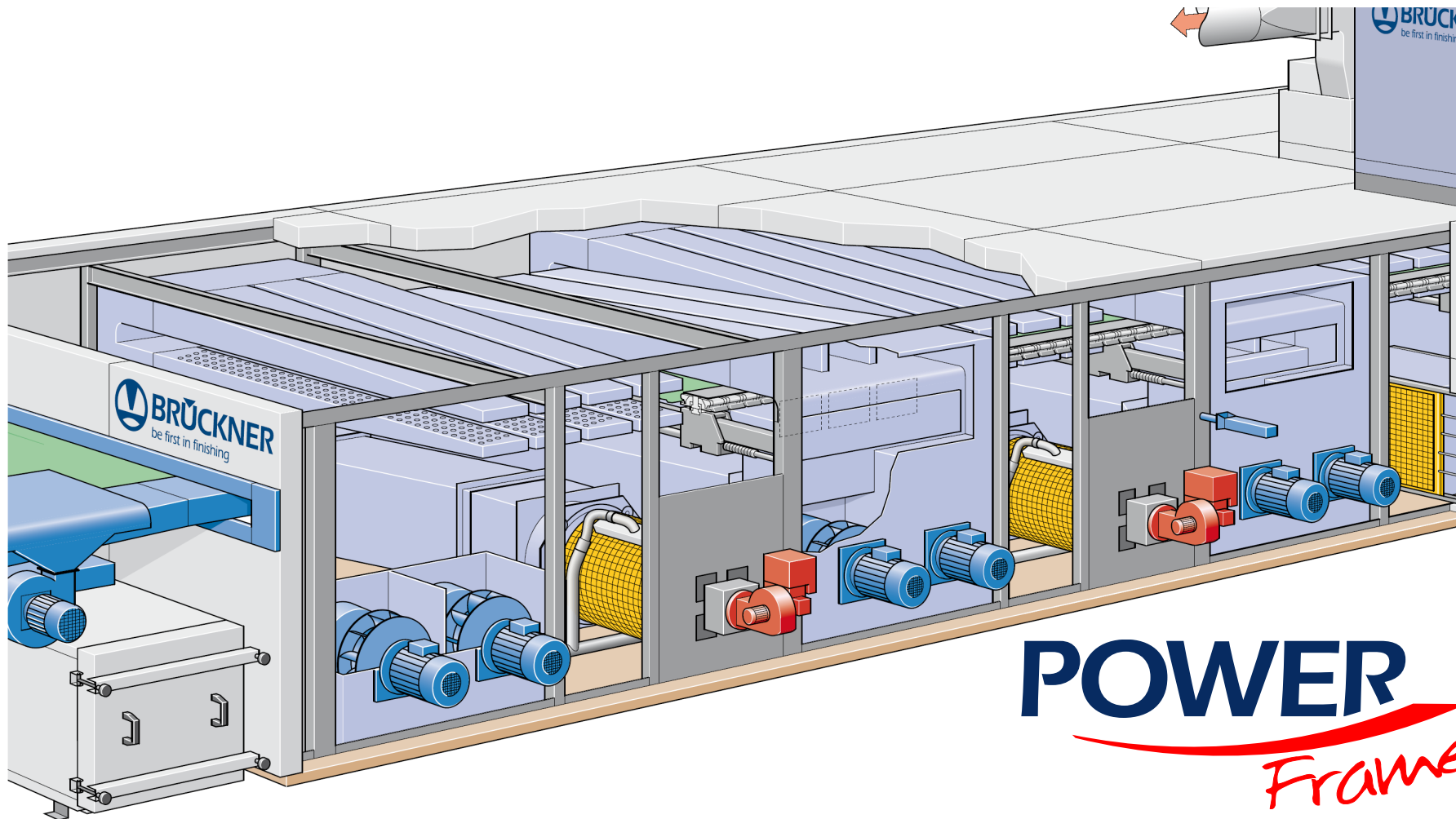
one sided



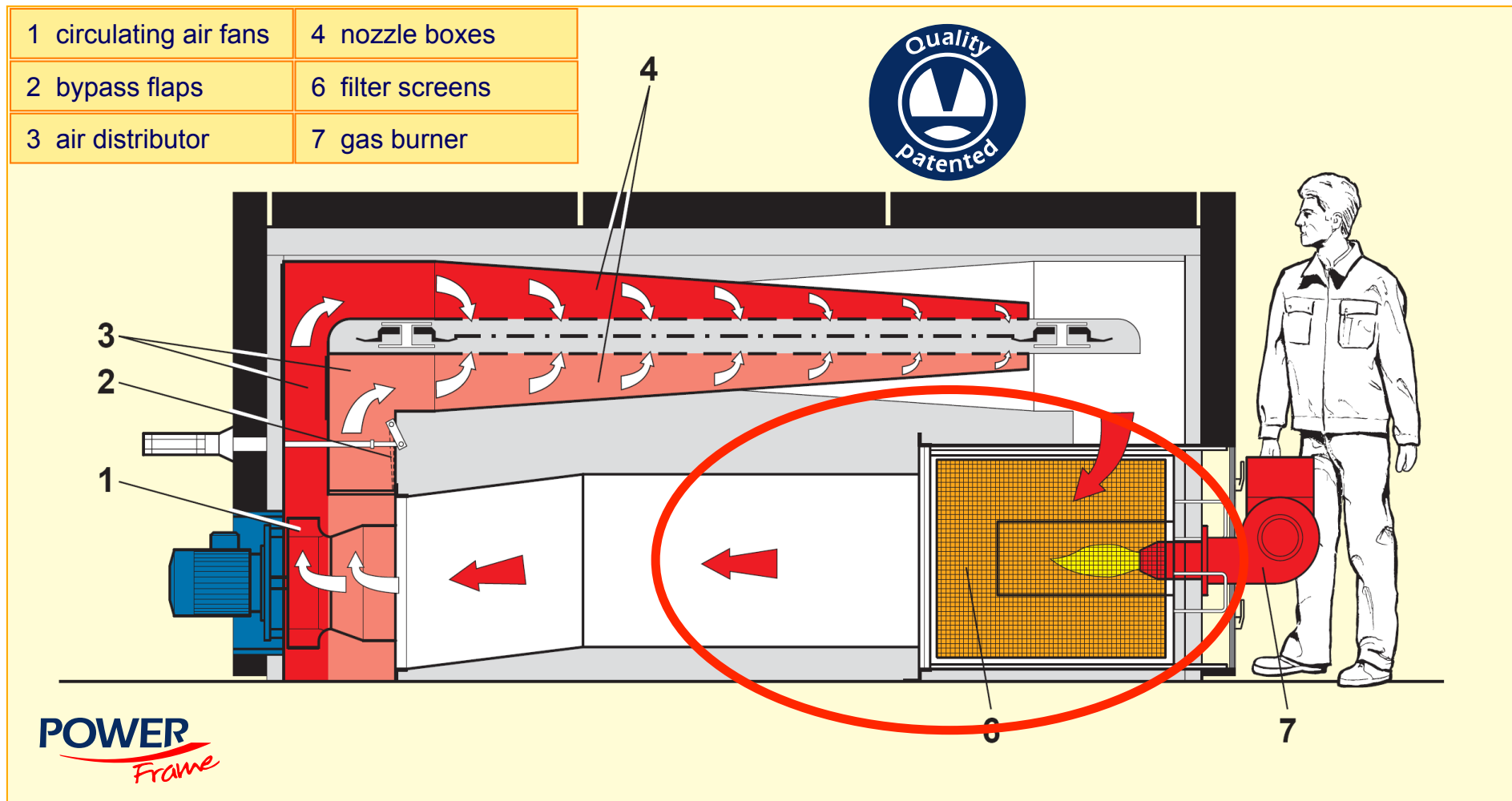
opposite



Optimized Arrangement of Heating and Air System

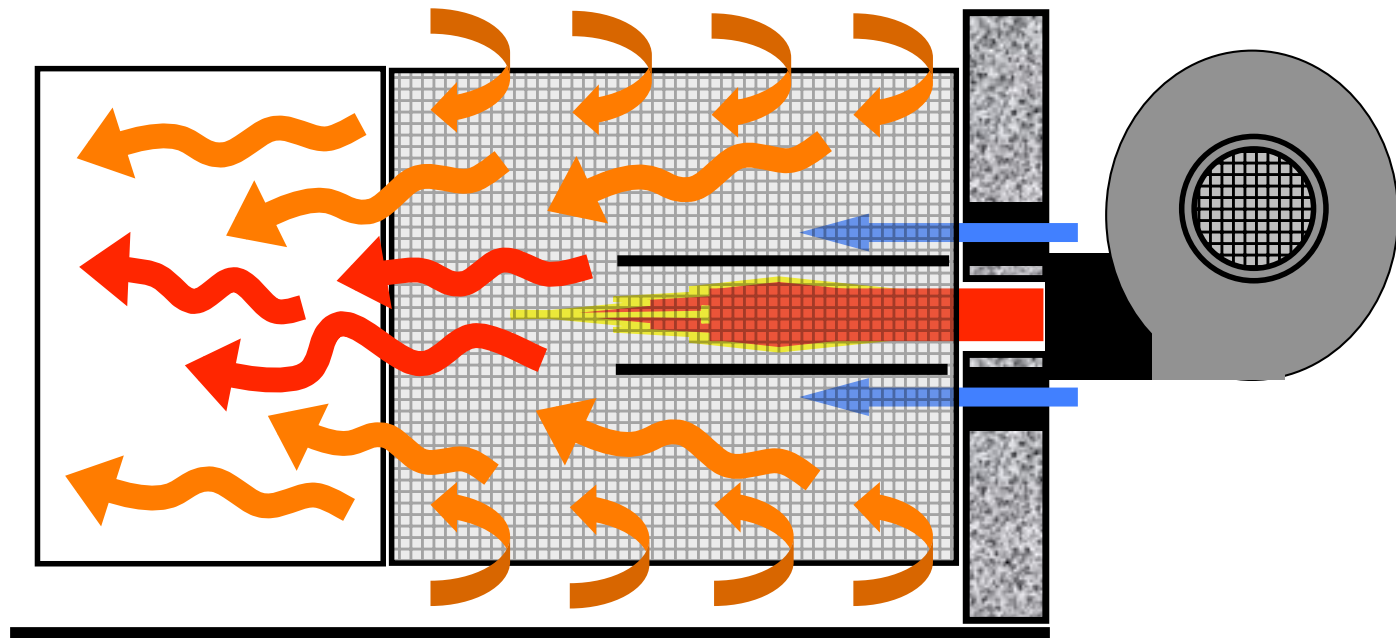


BRÜCKNER VenturiJet Technology



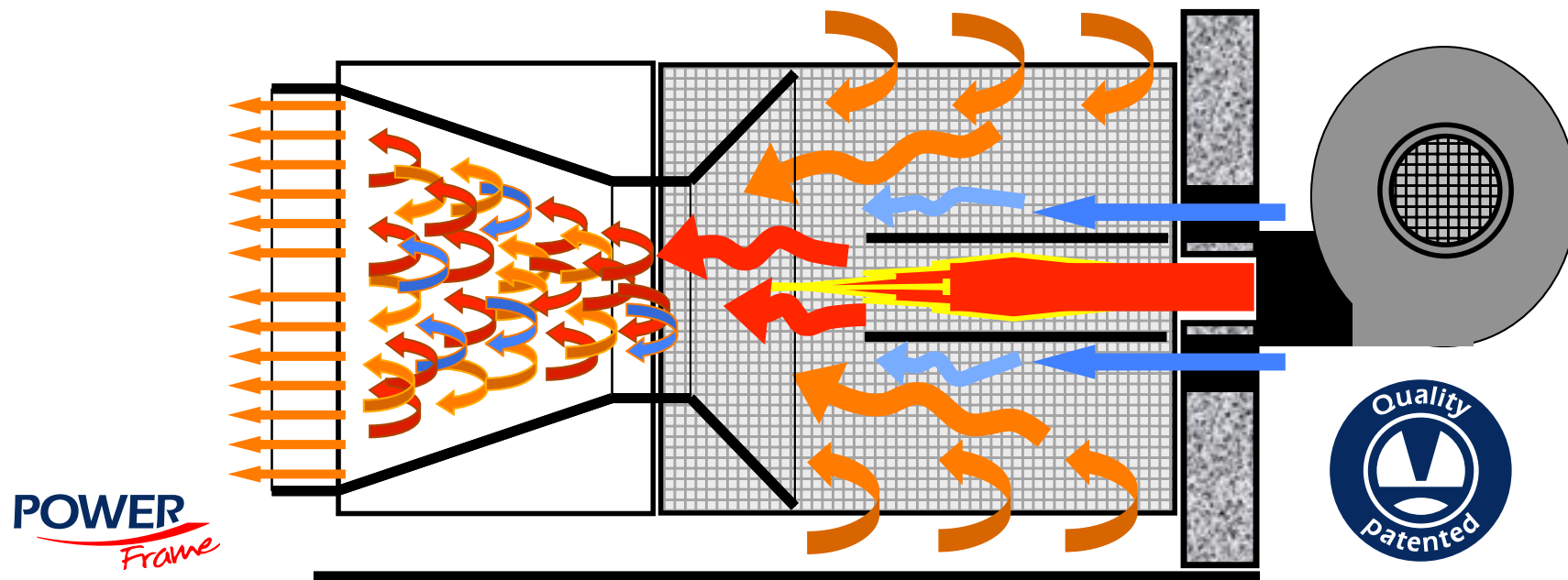
Conventional Technology

- ➡ insufficient mixing of single air streams
- ➡ risk of hot air jets and local over-heating
- ➡ difficult temperature control and volatile level

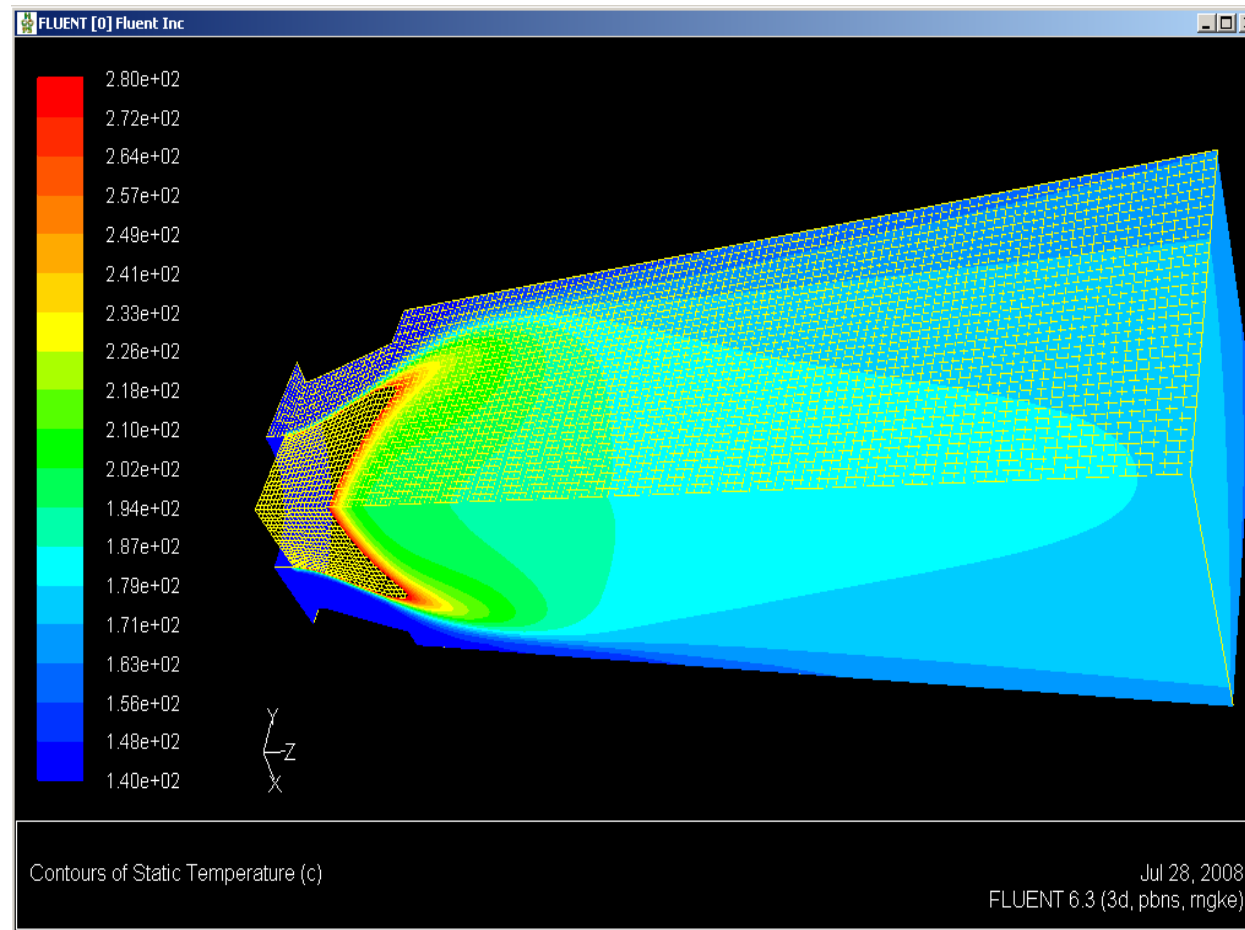


BRÜCKNER VenturiJet Technology

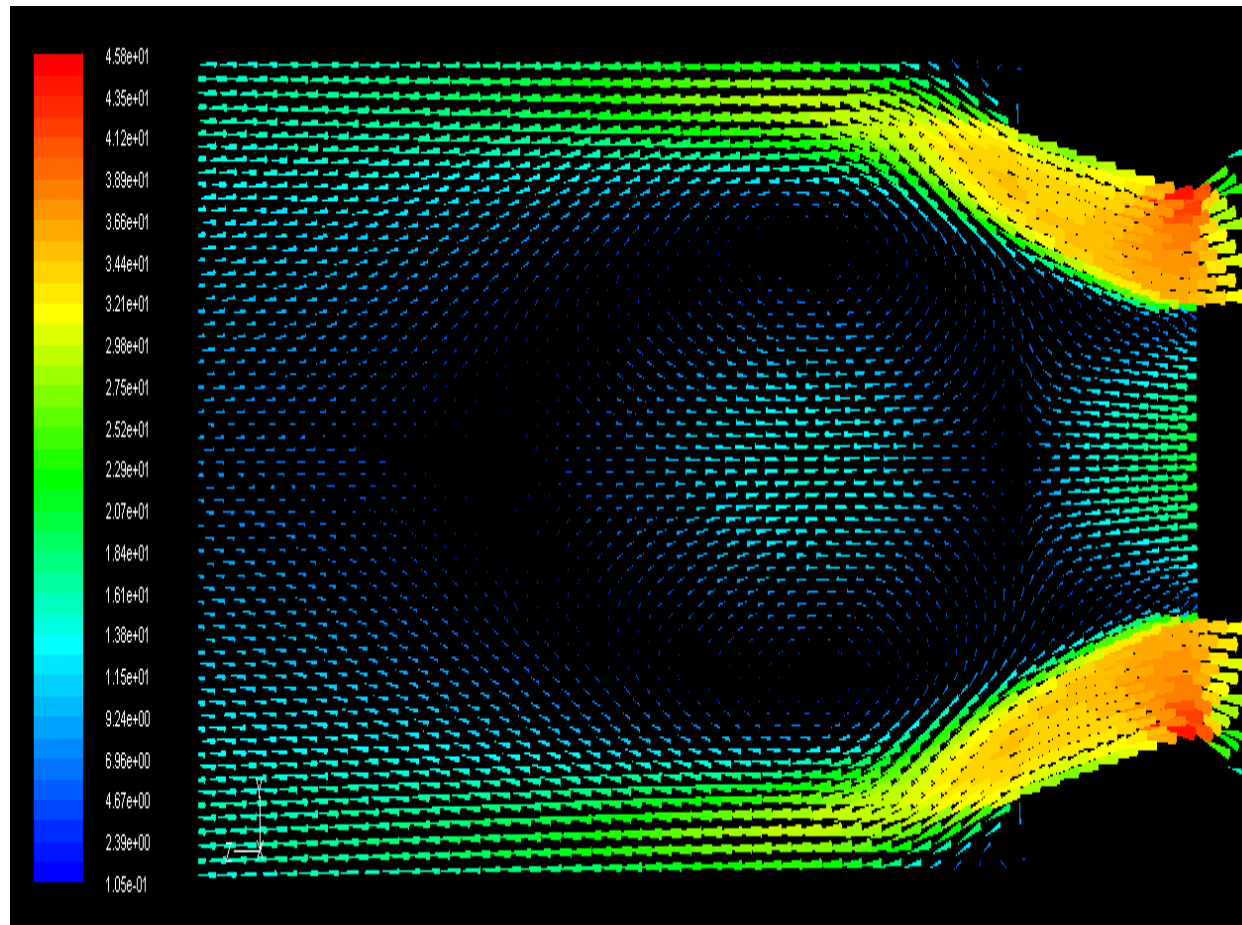
- ➡ principle: acceleration of single air streams and subsequent expansion
- ➡ generating of micro turbulences when passing diffusor
- ➡ highly efficient air mixing at minimum pressure losses
- ➡ optimal temperature evenness and extremely accurate control



Temperature Distribution by VenturiJet Nozzle

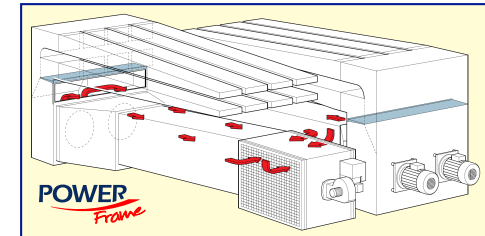
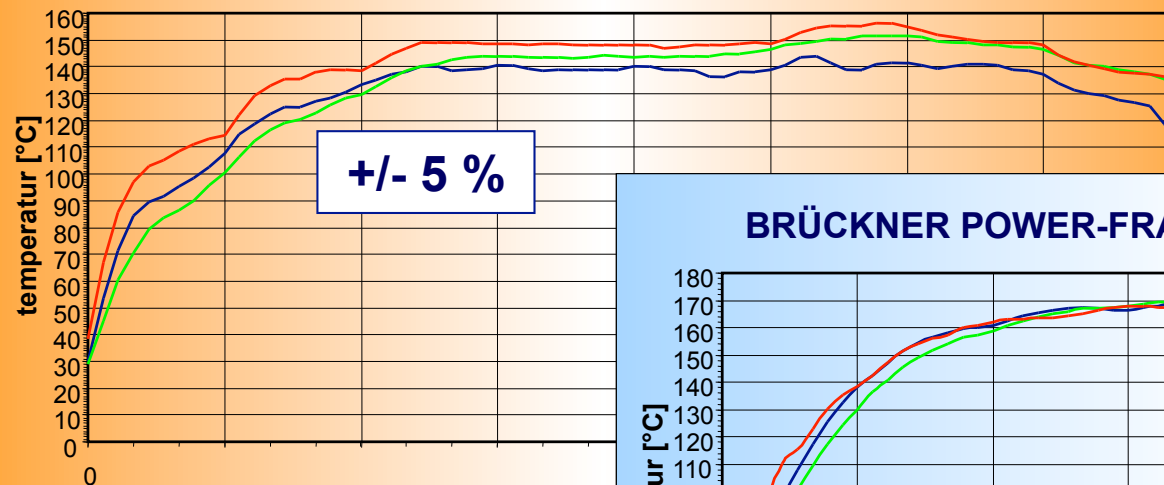


Air Speed Distribution after VenturiJet Nozzle

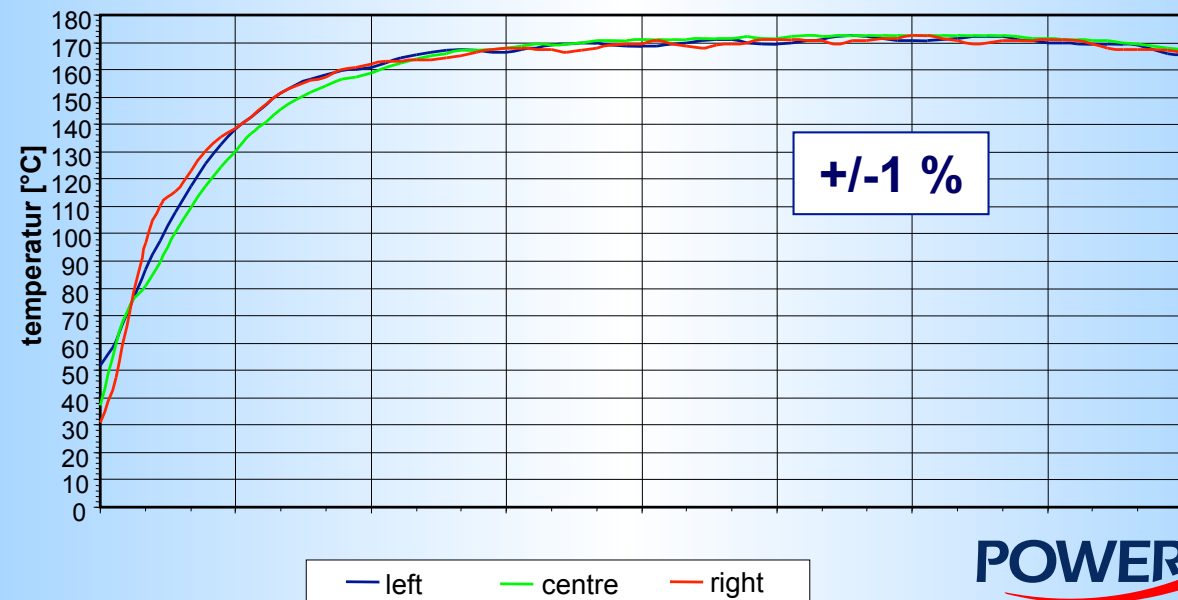


Counter Arrangement and VenturiJet Technology

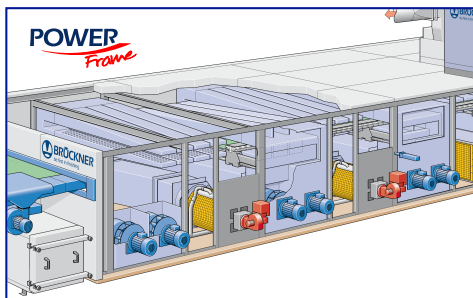
competitor without counter arrangement



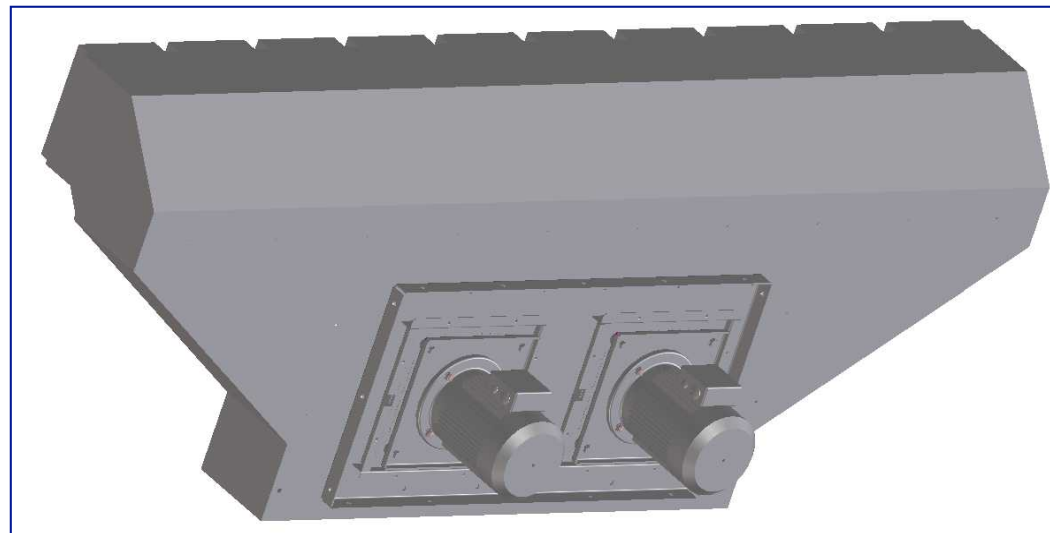
BRÜCKNER POWER-FRAME with counter arrangement



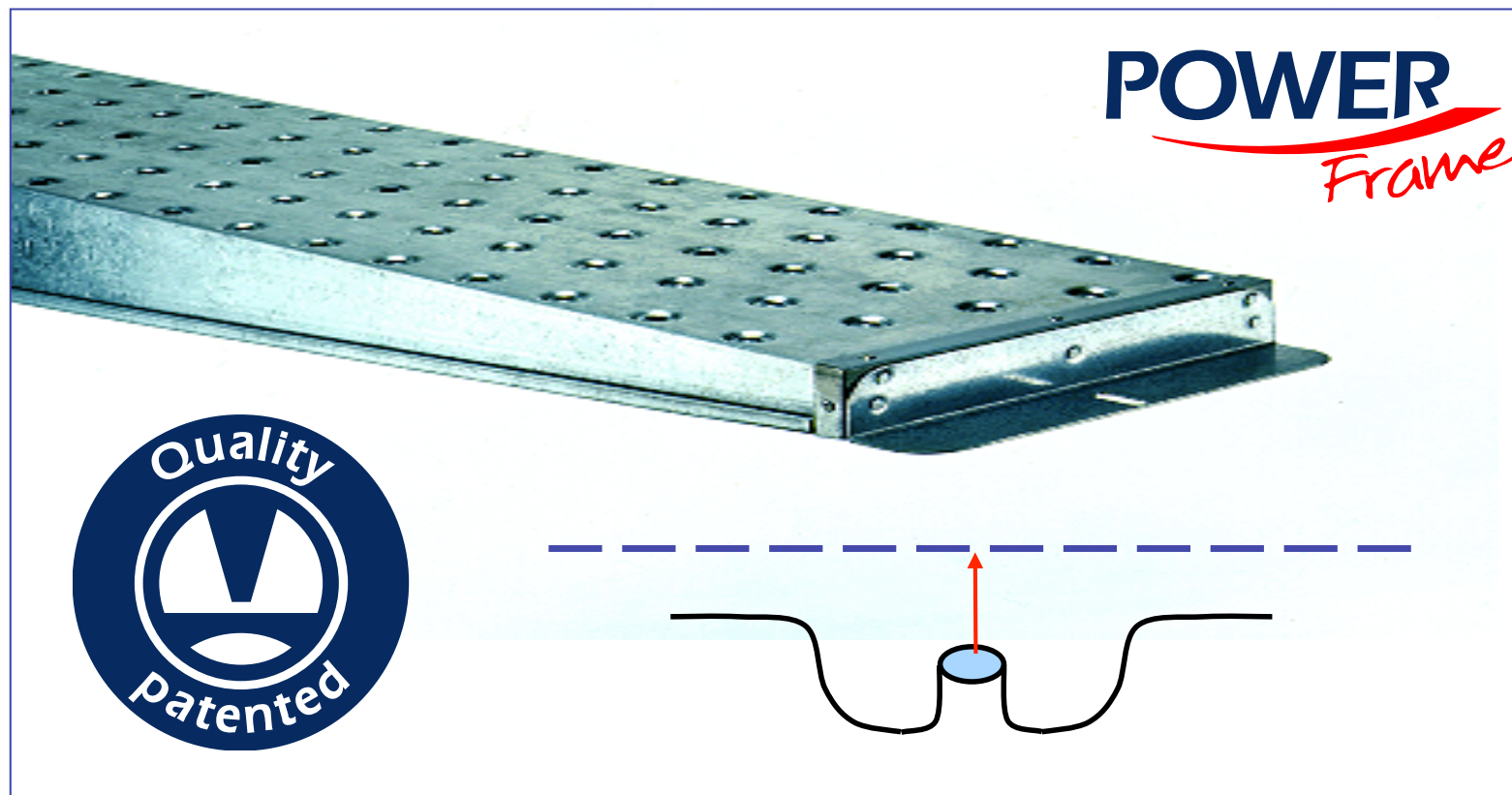
POWER
Frame



Correctly Dimensioned Air Ducting

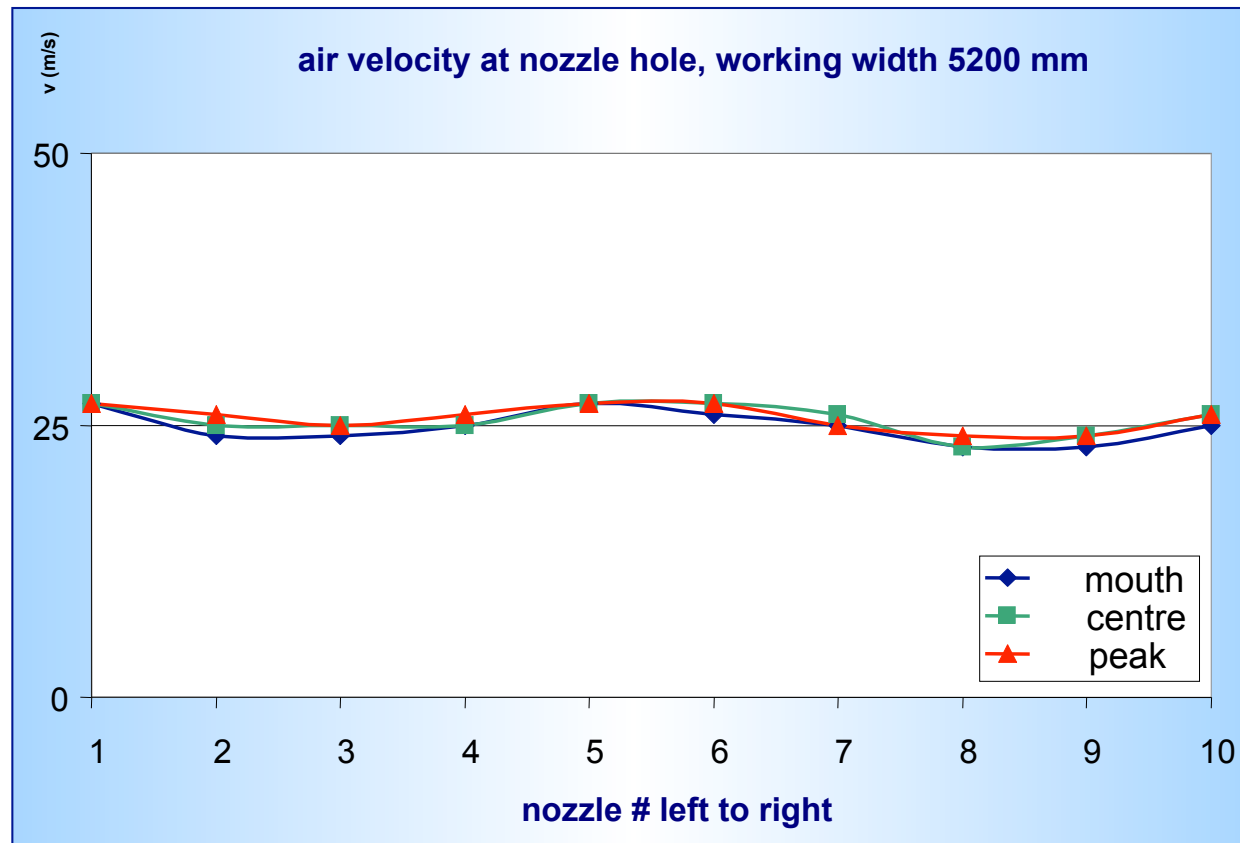


Innovative Nozzle Hole Design



Example For Uniform Air-Flow

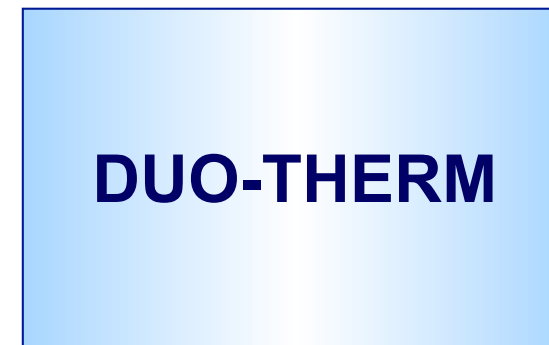
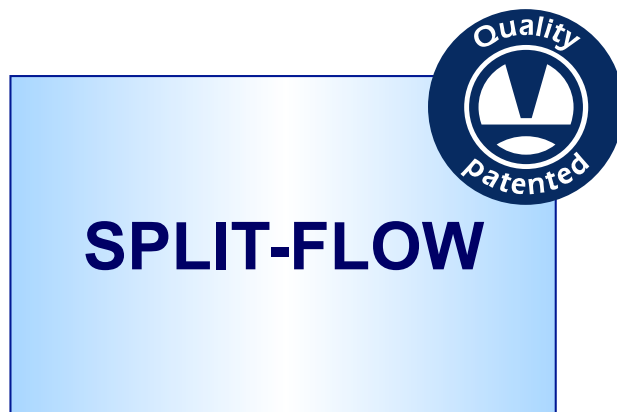
POWER
Frame



Special Ventilation Systems



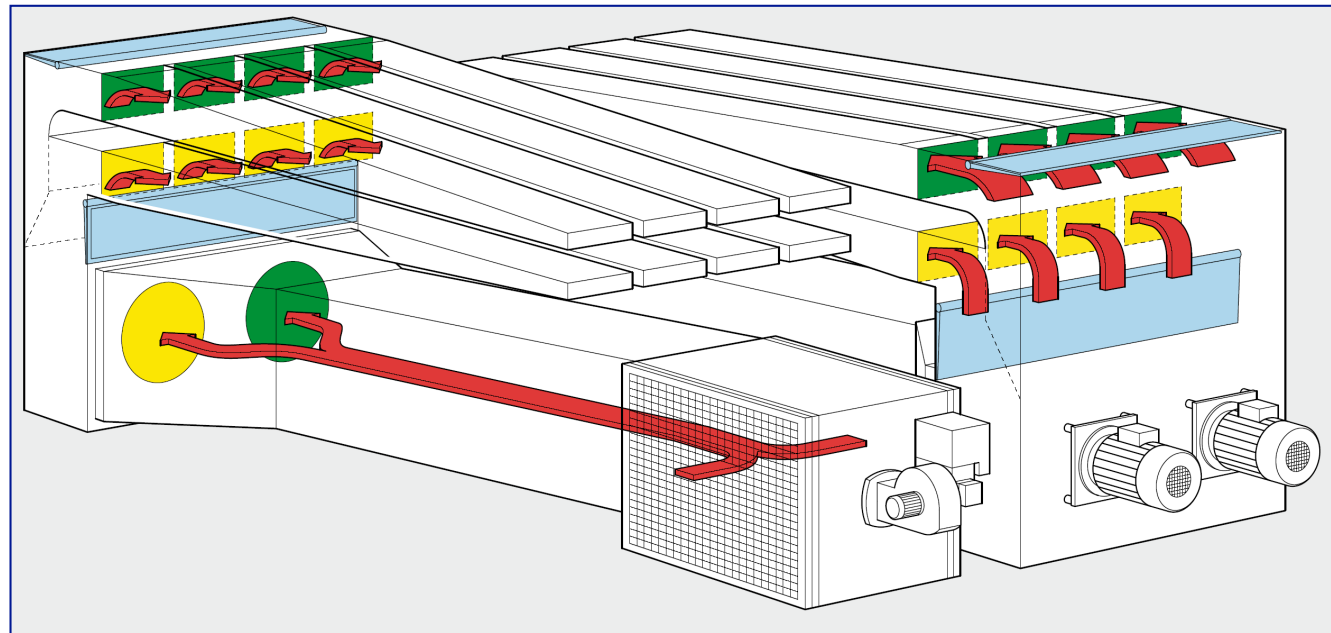
Special Ventilation Systems Invented by BRÜCKNER



Patented SPLIT-FLOW System



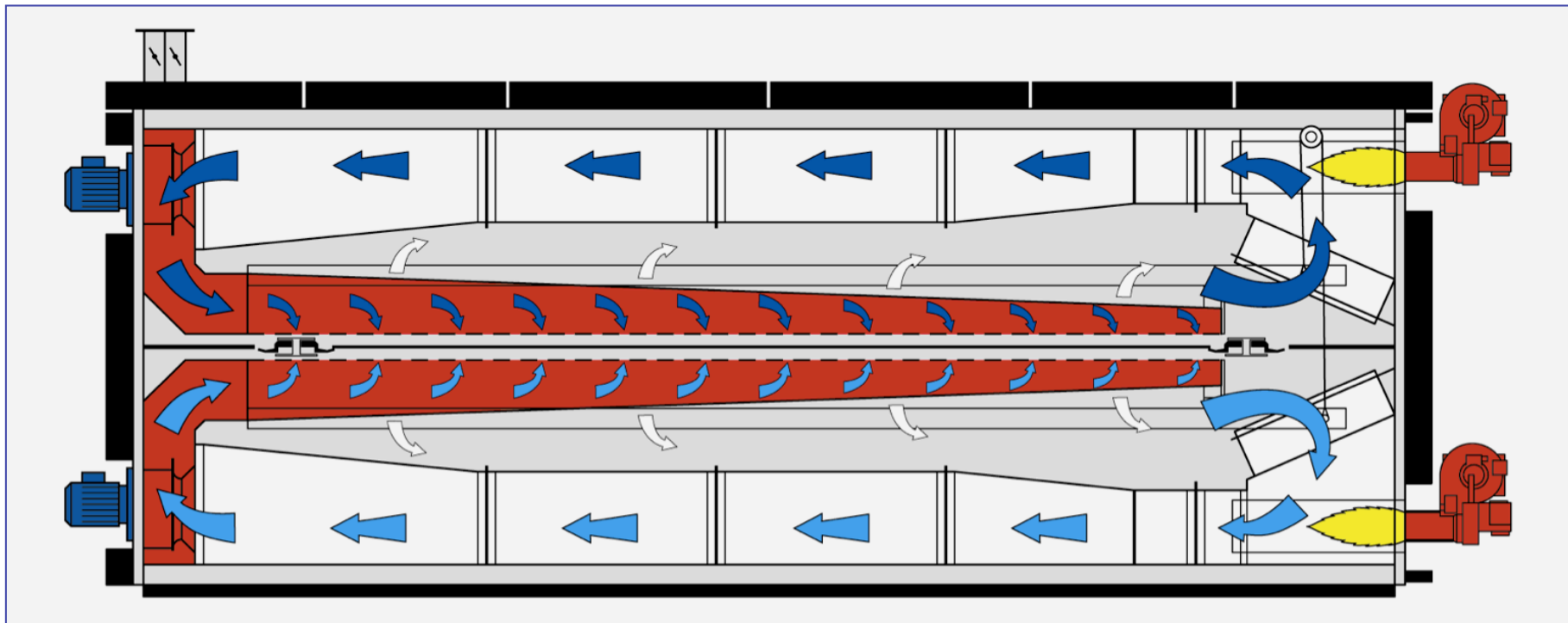
advantages



- ➡ independently adjustable circulating air circuits for top and bottom nozzles
- ➡ air volume settings through FC instead of throttle flaps, therefore no pressure losses
- ➡ short heating sections (only 1500 mm in length) and counter arrangement
- ➡ highest evenness across the width – exact and optimal process temperature profiling



DUO-THERM Technology



- both sided impingement of the web from top and bottom
- physical separation between top and bottom level

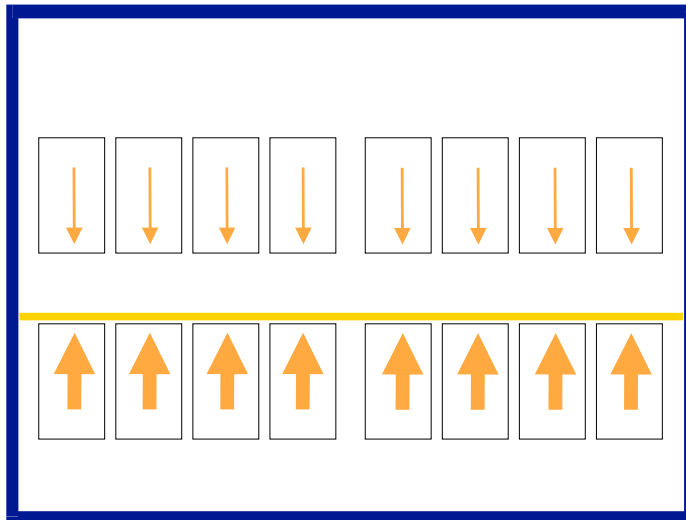


DUO-THERM Technology

independant settings

air speed

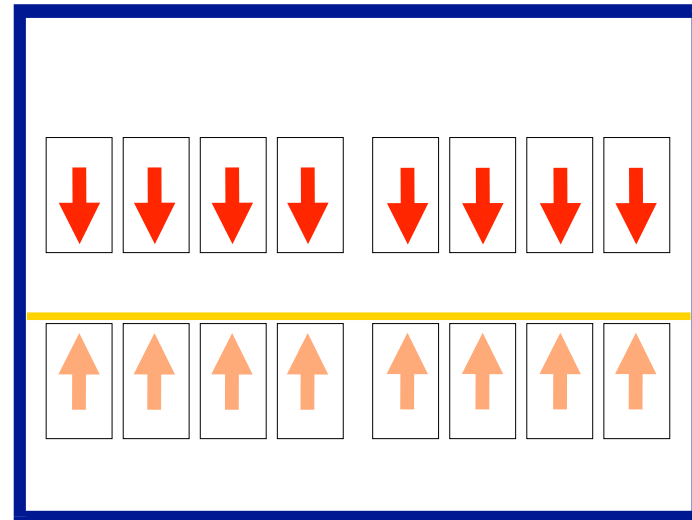
upper/lower nozzles



independant settings

air temperature

upper/lower nozzles



DUO-THERM for Different Product Structures

upholstery

homogeneous
structure

composites

double-sided
structure

waddings

sandwich
structure

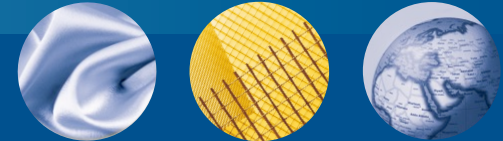


Summary

- Thermal treatment in one or several process stages is necessary for almost all technical textiles and nonwovens products thus it has an important influence on product quality and costs.
- As in most cases the production of technical textiles is a multi-step process, highest final product quality can only be reached if the equipment for each process step is of highest quality too.
- For convection machines are essential: even temperature and air volume distribution across the material width, efficient heat transfer, exact and reproducible energy dosing.
- New innovative products and composite structures challenge the manufacturers of thermal treatment machinery. Measures for efficient utilisation of the requested energy and its recovery confer a major edge.
- With 60 years of experience in thermal treatment and more than 5000 delivered ovens BRÜCKNER belongs to the market & technology leaders in this sector.



Thank you for your attention!



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