ONEJOON GmbH
Test Center

www.onejoon.de

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Agenda

1. General Company Info
2. ONEJOON Test Center
3. Overview of Test Furnaces
4. Environment & Safety
5. Measuring Equipment

01
General Company Info

Facts and figures about ONEJOON

We are Your Partner for Thermal Production Systems

Locations

Represented in 6 countries with 11 locations worldwide

Employees

Approx. 500 employees worldwide, more than 250 design engineers, researchers and developers

Innovation

Ongoing culture of innovation ensured by German and Korean Test Center and R&D department

Factories

Quality made by ONEJOON with own factories in Korea, China and Poland

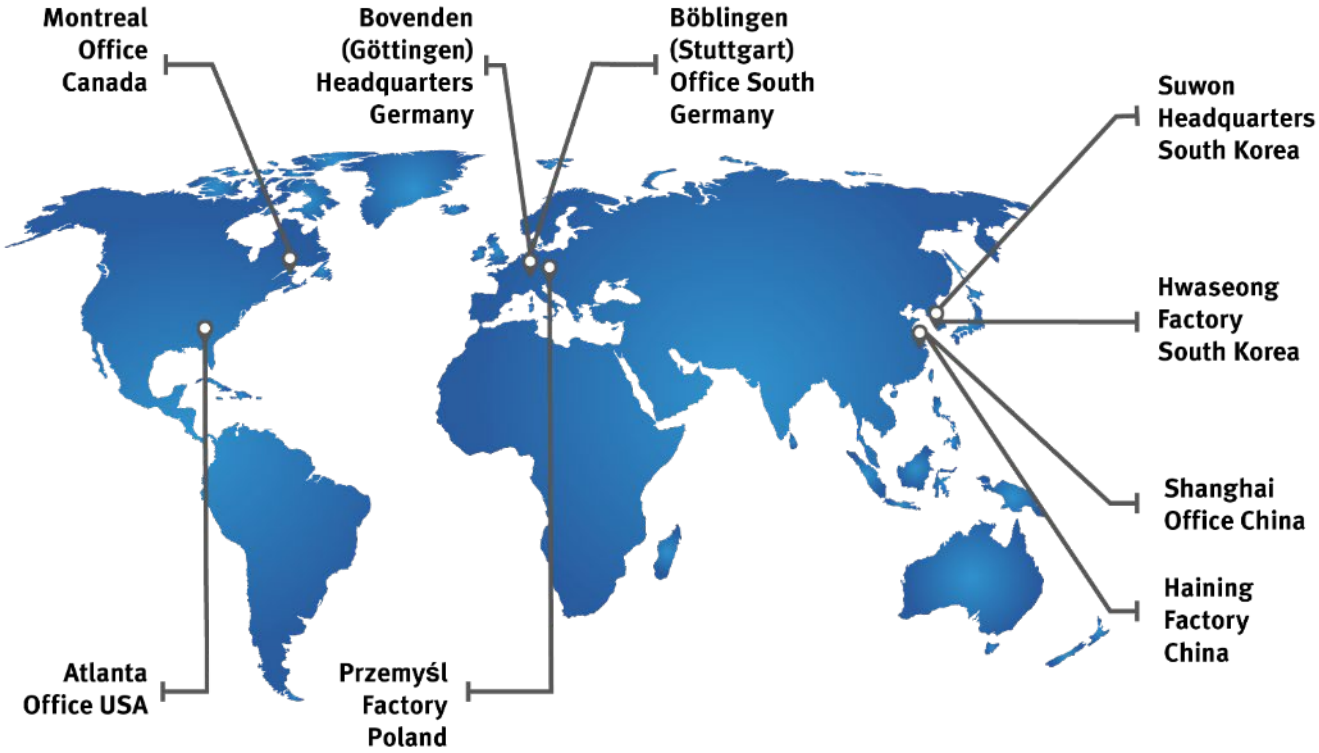
Experience

Experienced project management team with project sizes up to € 100 Mio.

Equipment

Thermal process equipment up to 3000 °C and turnkey process production lines

ONEJOON Around the World



Factories and Facilities

Korea

Headquarters of ONEJOON Co. Ltd. in Suwon

Germany

Headquarters of ONEJOON GmbH in Bovenden (near Göttingen)

Germany

ONEJOON GmbH Office South in Böblingen (near Stuttgart)

USA

Headquarters of ONEJOON Inc. in Roswell, Georgia

Germany

Test Center of ONEJOON GmbH in Bovenden

China

Production of ONEJOON Co. Ltd. in Zheijiang

Poland

Production of ONEJOON Poland sp. Z o.o. in Przemysl

02

ONEJOON Test Center

We provide the conditions to test your heat treatment process

ONEJOON Test Center

A playground for innovation in heat treatment

- 4500 square meters of testing area
- 8 furnace and kiln types available for testing
- Experienced employees dedicated to guiding you and monitoring your tests
- Range of measurement equipment to obtain crucial data
- Long-time tests possible

Extensive testing is the key to your pilot and ultimately your production line.

Preparation of saggers by our staff

Test Roller Hearth Kiln

Developing Your Heat Treatment Process

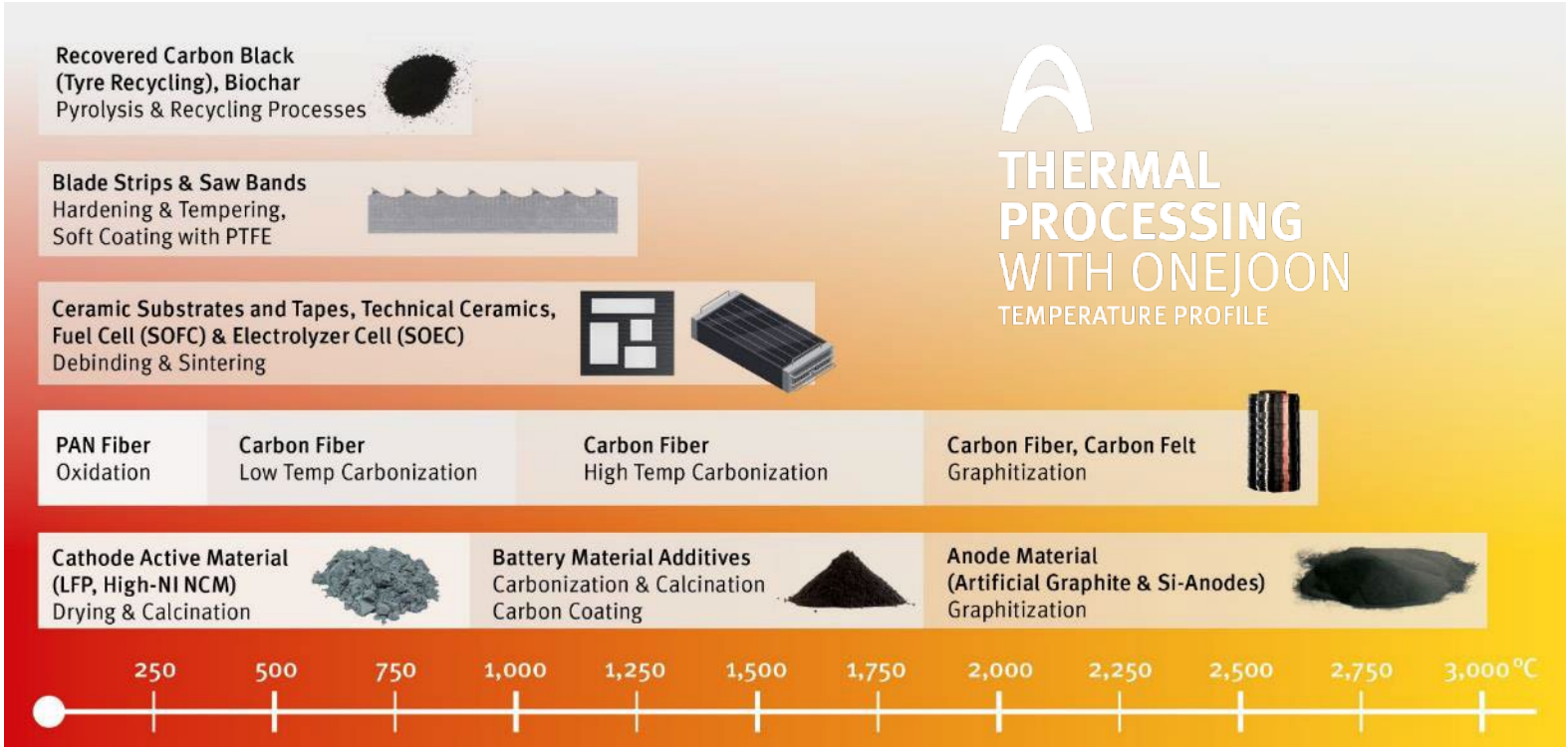
Examples of tested materials

- Battery powders
- Powder metals
- Powder chemicals
- Ceramics
- Carbon fibers
- Aluminum heat treatment
- Organic materials
- Recycling processes

Your Benefits

- Tap into our expertise during the development and optimization of thermal processes
- Continuous development and improvement of your product
- Optimize your production processes by performing tests under realistic conditions
- Focus entirely on the development of your products
- Reduce operating costs by optimizing processes and consumption
- Risk reduction by pre-tests with original material
- Enhace product quality through testing
- Establish a trusted and long-term cooperation with ONEJOON

Developing Your Heat Treatment Process



03

Overview of Test Furnaces

Explore the full range of testing possibilities

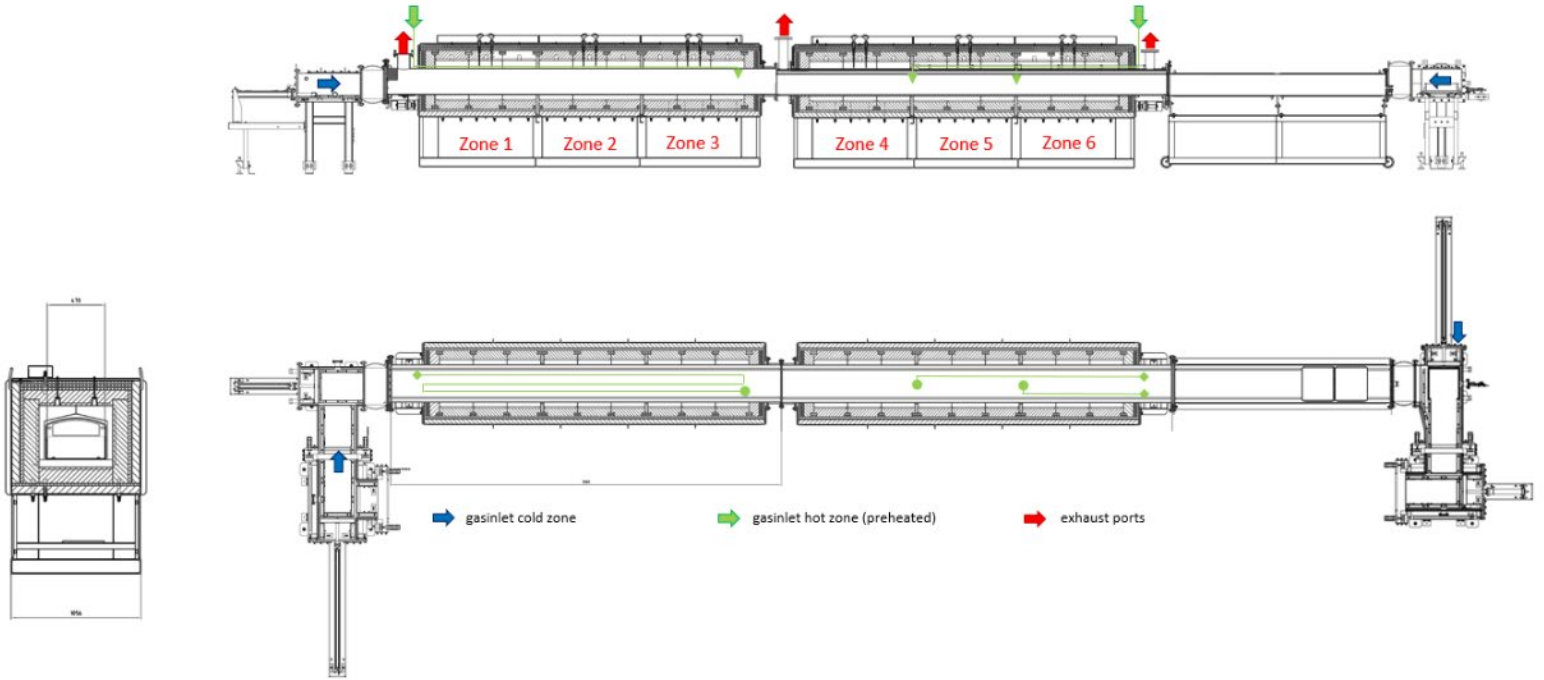
Multifunctional Furnace

Technical Highlights

- Versatile functions
- Gas pre-heating
- Gas humidification
- Entrance and exit airlocks
- Cooling zone at outlet
- Use as pusher-type or pull-through furnace possible

Atmosphere	Air, inert gas, burnable gas
Temperature zone 1-3	up to 700 °C
Temperature zone 4-6	up to 1000 °C
Number of seperately controllable heating zones	6
Heated length per oven segment	Approx. 4400 mm
Muffle profile	Width: approx. 470 mm Height: approx. 250 mm

Multifunctional Furnace – Pusher Slab Configuration

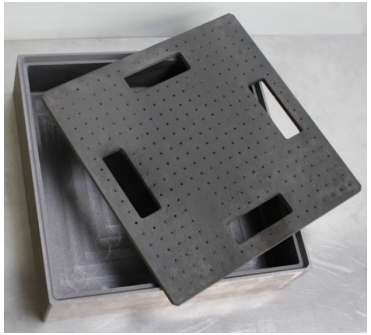


Product Carriers / Saggers / Trays

Our kilns can be equipped with different carriers / saggers /trays. Shape, size and materials are individually adapted to the process.

Examples: aluminum oxide, silicium carbide, stainless steel, graphite

Sagger material	Length [mm]	Width [mm]	Height [mm]
Graphite	420	420	115
Stainless steel	420	420	115
Silicium carbide	330	330	102
Aluminum oxide	330	330	102



Rotary Kiln

Technical Highlights

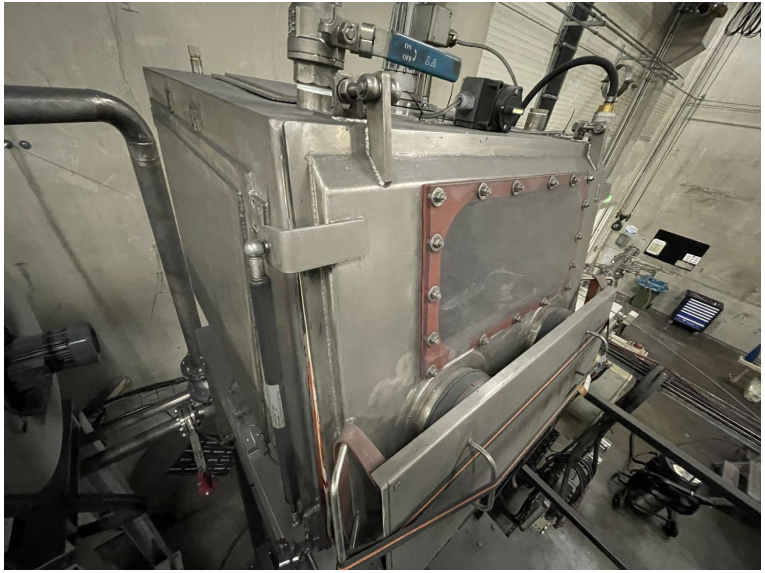
- Suitable for small-scale tests
- Variable tilting angle
- Variable rotation speed
- Optional use of condensor
- Optinal use of glove boxes to handle material under nitrogen

Rotating tube material	Inconel, other materials possible by request
Rotating tube diameter	Approx. 220 mm
Heated rotary tube length	Approx. 1800 mm
Max. temperature	1100 °C
Atmospheres	Air, nitrogen, hydrogen
Controlled temperature zones	3
Rotation speed	Min. 1 rpm, max. 10 rpm
Tilting angle	0-5°

Rotary Kiln – Glove Box

Glove Box

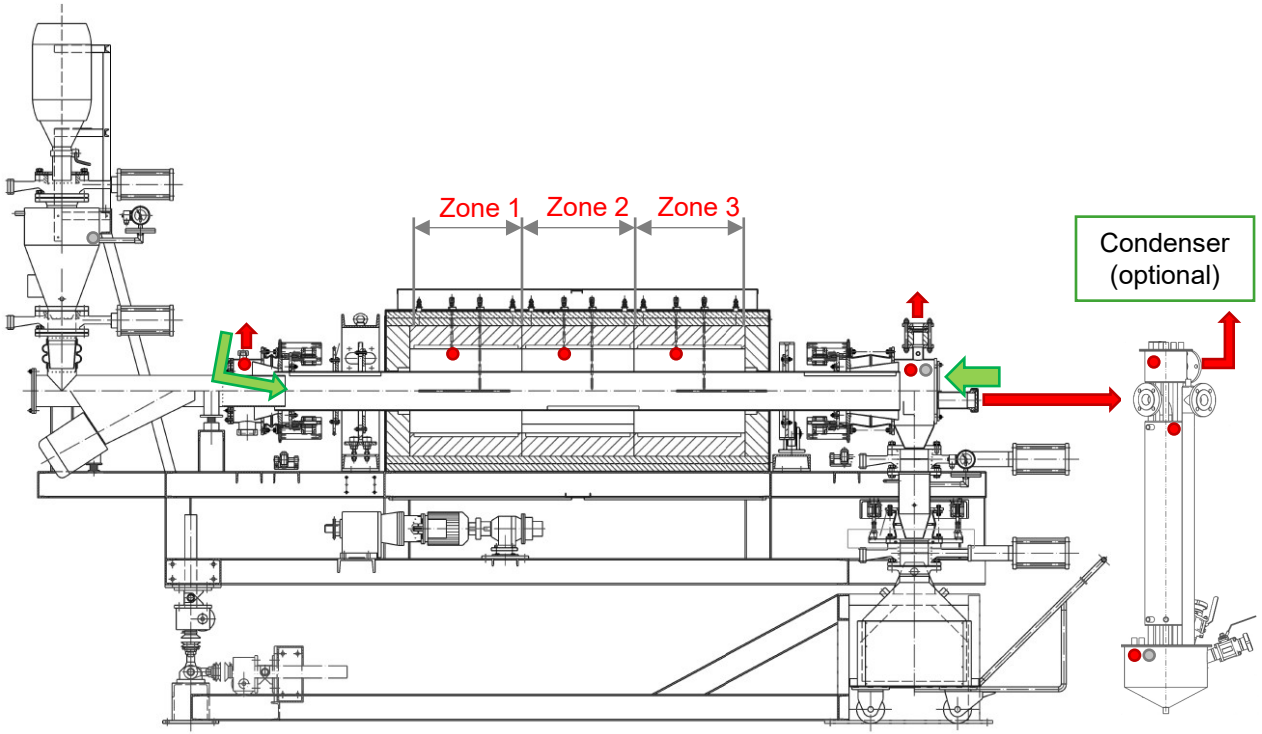
- Suitable for materials that must not be exposed to humidity and oxygen
- Air-tight
- Protective atmosphere



Inlet

Outlet

Rotary Kiln – Gas Flow and Measuring Points

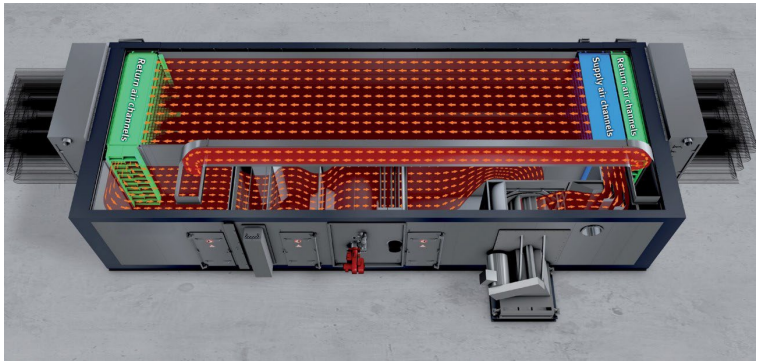


E2E Ent-to-End Oxidation Furnace

Technical Highlights

- Incorporated hybrid heating system
- Only one air circulation zone
- Greater range of catenary sags allowed

Heated length	13 m
Working width	3 m
No. of passes	10 passes
Air velocity	2.5-3.5 m/s
Heating	Hybrid (gas and electric)



High-Temperature Test Furnace (Ariane 3000)

Technical Highlights

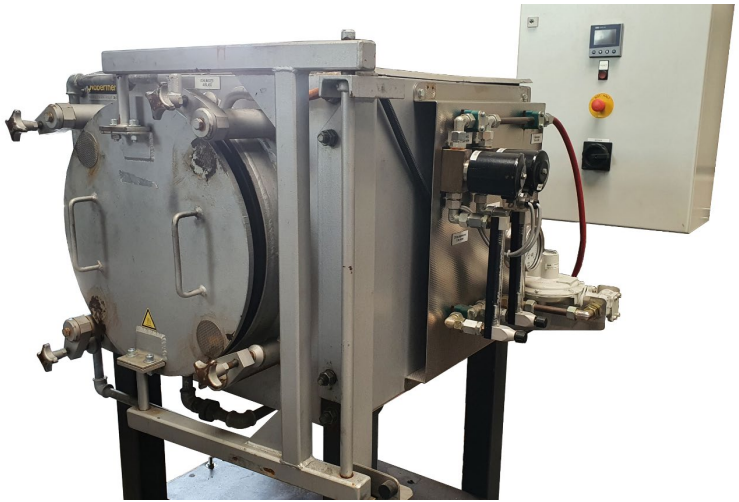
- Suitable for small-scale tests

Max. temperature	3000 °C
Possible atmospheres	Nitrogen, Argon
Crucible size	Diameter: 34 mm Height: 120 mm

Test Chamber Furnace

Technical Highlights

- Live weight measurement during process
- Gas analysis



Max. temperature	1100 °C
Possible atmospheres	Air, inert gas
Chamber size	Width: 320 mm Depth: 450 mm Height: 150 mm
Max. batch weight	35 kg

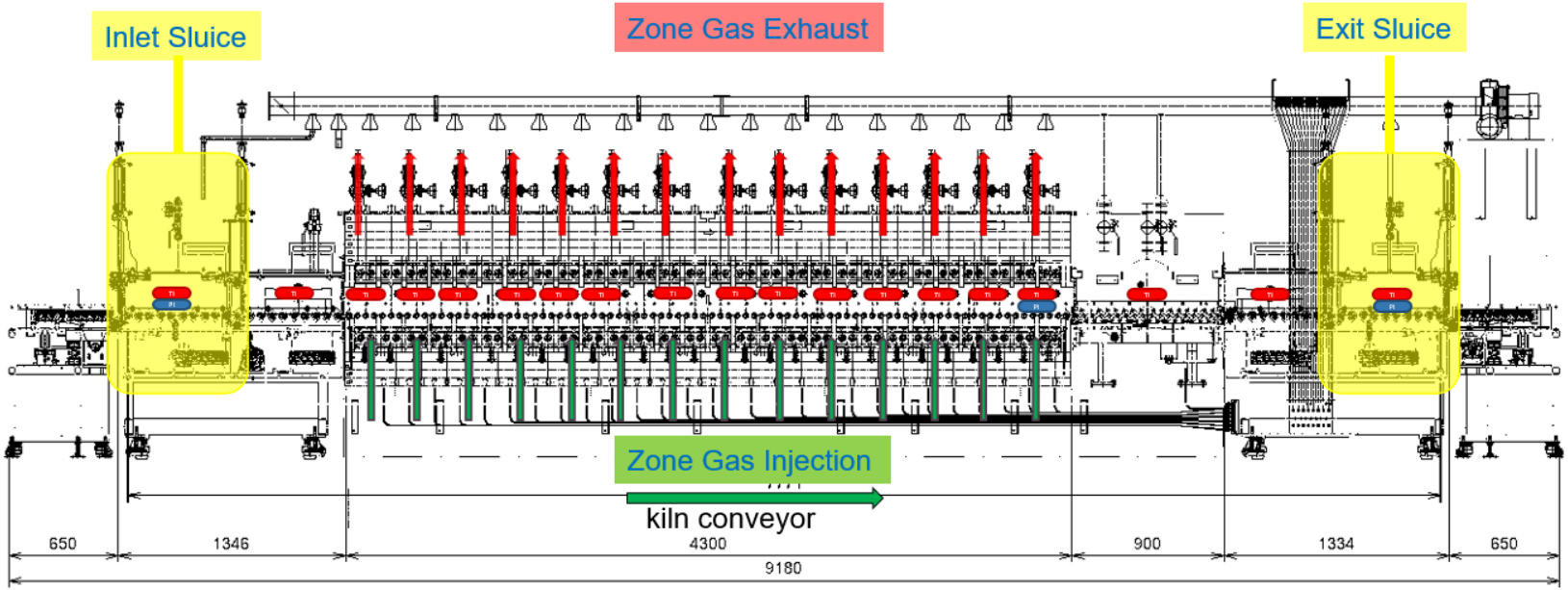
Roller Hearth Kiln

Technical Highlights

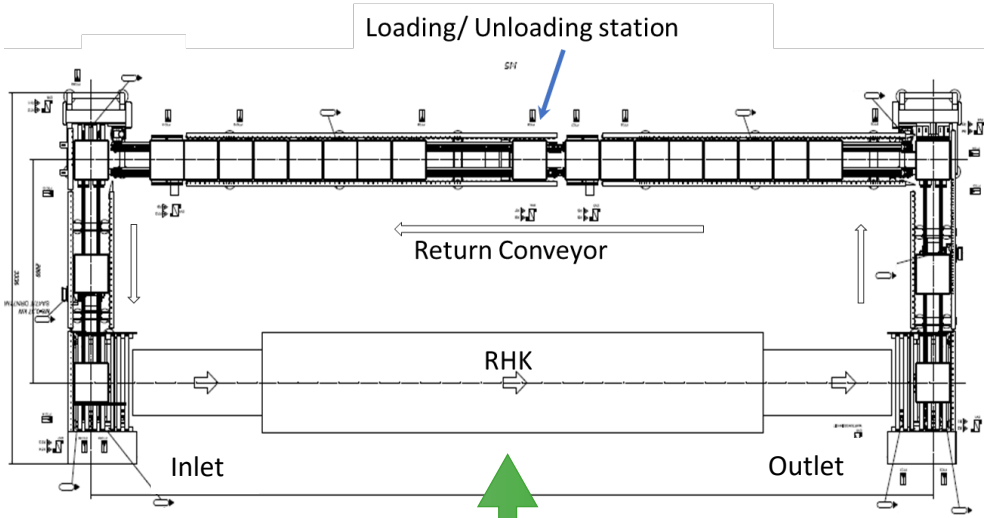
- Versatile functions
- Different atmospheres in one process
- Test of atmopshere conditions – check if product performs better under protection or active gas conditions (e.g. N2, O2, forming gas atmosphere)

Atmopshere	Air, inert gas
Max. temperature	1.350 °C
No. of separately controllable heating zones	14
Heated length	Approx. 4420 mm
Max. size product carrier / saggar / tray	Length: 390 mm Width: 390 mm Height: 100 mm
Cooling zone length	900 mm

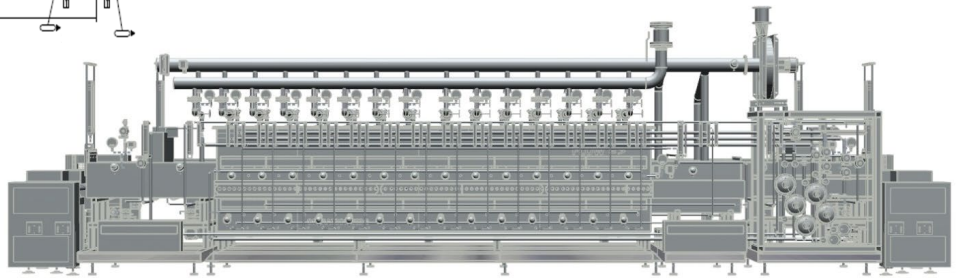
Roller Hearth Kiln – Scheme



Roller Hearth Kiln – Overview



Front view



Roller Hearth Kiln – Product Carriers

Other important RHK components

- Spacers
- SiSiC plates
- RSiC plates (low risk of breaking)

Product carrier	Length [mm]	Width [mm]	Height [mm]
SiSiC plates	390	390	6
	390	390	4
RSiC plates	390	310	6
Spacers	40	40	70
	20	20	20

Annealing Furnace

Technical Highlights

- Horizontal or vertical air flow possible
- Quenching with air

Max. temperature	630 °C
Atmosphere	Air
Chamber size	Width: max. 1500 mm Depth: max. 1300 mm Height: max. 1000 mm
Max. batch weight	35 kg

04

Environment & Safety

Reduce emissions and protect the environment while testing

Environment & Safety

Thermal Post-Combustion

- High flexibility and efficiency
- Compliance with given emission limits
- Maximum safety
- Environmental protection in all operating conditions
- Combustion temperature up to 900 °C

05
Measuring Equipment

Gain a variety of data with our measuring devices

Measuring Equipment

We have more than 150 measuring devices at our disposal

- Gas analysis: various devices for analyzing the process gases and exhaust gases, e.g. Mesa Megas2, Testo 350
- Climate measuring devices, e.g. Test 480
- JUMO data logger
- Temperature measurements
- Dew point mirror
- Combustion gas detector
- Oxygen measuring devices
- Carbon monoxide measuring devices
- Thermal imaging camera
- Sound level measuring device
- Thermal flow probe

Measuring Equipment

Gas Measurement – Overview

Gas	Typical Applications	Measurement Range
O_2	Ambient air monitoring, safety, process control	0 … 25 Vol%
NO	Emissions, exhaust gas analysis	0 … 3000 ppm
NO_2	Emissions, exhaust gas analysis	0 … 500 ppm
CO	Ambient air monitoring, safety, Emissions, exhaust gas analysis	0 … 10,000 ppm (1 Vol%), with dilution up to ~40 Vol%
CO_2	Process control, emissions, exhaust gas analysis	0 … 50 Vol%
CH_4	Leak detection, process control, safety	0 … 4 Vol% (40,000 ppm)
H_2	Ambient air monitoring, safety, Leak detection, process control	0 … 100 Vol%
HCN	Ambient air monitoring, safety	0 ... 30 ppm
H2S	Safety	0 ... 50 ppm

*Measurement ranges are typical practice values and depend on the sensor/method used.

Thank you!

Do you have any questions?

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