



Barth Tornado  
and Zonda roaster.  
**Flexible roasting  
systems for grains.**

# Barth Tornado N/RSX and Zonda roaster.

## **Color signature roasting of barley and malt.**



The demand for signature-flavored and dark beer has resulted in greater demand for appropriately roasted barley and malt. The Barth Tornado and the Zonda roaster combine proven roasting technology with smart innovations, enabling breweries and maltsters to roast their own dark barley and malt in small batches with outstanding quality.

Roasting barley and malt is an art that requires significant process expertise in order to obtain the desired end product properties such as extractable color and product yield.

For more than 50 years, Bühler Barth has been providing smart and safe technology for the signature roasting of barley and malt in order to develop individual color and flavor styles (e.g. caramel, crystal, “winter warm”, chocolate and roasted malt) with reproducible processes. Leading breweries and malting plants have been using Bühler Barth roasting systems successfully and with satisfaction for decades.

The Barth Tornado and Zonda roaster is a tailor-made solution for craft market requirements and is specifically designed for small, medium and large breweries and malting plants.

Based on a unique operating principle the Barth Tornado and Zonda roasting system combines roasting and quenching for optimal color and taste development in a single machine.

A further highlight is the new small-scale Zonda 100 roaster that enables craft breweries and small malting plants to achieve optimal recipe differentiation within a 60–100kg batch process. The Zonda roasting process is strictly conductive with

### **Customer benefits**

- Reliable and flexible state-of-the-art technology from the market leader in various roasting applications.
- Batch roasting allowing a reproducible artisan and craft-roasting profile or automatic processing.
- Tailor-made barley and malt roaster for the demands of small, medium and large breweries and malting plants.
- Support in product development from Bühler pilot plants and laboratories.
- Worldwide maintenance and services for maximum machine utilization and efficiency.



the focus on craft roasting. The roaster is able to roast the whole product range with the focus on the stewing process.

The larger scale Barth Tornado RSX roaster demonstrates maximum flexibility and process control. With the option to change between conductive and convective roasting and precise under pressure control during the stewing process, it sets the benchmark on the market. The precise under pressure control allows the dehydration speed to be controlled and thus with it the critical stewing reactions. Thanks to easy and flexible process control, a broad range of recipes can be realized and reproduced.

With its batch processing, the Barth Tornado and Zonda roaster allows roasting with reproducible processes. Specific roasting profiles permit end product differentiations with regard to flavor and dye potential, resulting in an almost boundless variety of recipe developments for maximum differentiation – see examples on this page.

The Zonda roaster is a result of the systematic ongoing development process of proven large-scale drum roasters and the answer to the demand for signature-flavored and craft beer.

An easy process control system and the conductive heating allow recipes to be developed for the whole product spectrum available on the market. Furthermore, the option for water addition during the conductive roasting process allows an increased stewing reaction time leading to new artisan recipes and taste creation. The size of 60–100kg per batch and the

attractive price permits small-scale craft roasting. The Zonda roaster makes it possible for the passion of craft breweries to evolve upstream to the roasting level at industrial quality.



Zonda roaster 100

**Optimal recipe differentiation for small-scale roasting (60–100 kg/batch)**

- Production of whole product spectrum.
- Craft roasting: Option to prolong the stewing process.
- Easy process control and attractive installation cost.

# Tornado N/RSX and Zonda roasting systems. **For small & medium breweries/malting plants.**



Barth Tornado RSX

The Barth Tornado RSX roaster is a result of the market demand to control and increase recipe flexibility for large-scale drum roasters.

This roasting system allows precise control of the inner drum pressure enabling optimal exact stewing conditions. Management of the inner drum atmosphere allows optimal Maillard and caramelization reactions to be controlled. This is realized by a dedicated pressure sensor that measures the inner drum

pressure combined with separate ventilator regulation for exact requirements.

Furthermore, a new sealing concept allows dedicated and controlled conductive heating. The inner drum pressure control allows the roasting conditions within the drum to be controlled precisely in order to achieve optimal caramelization reactions, for example. The new design with a dedicated convective air flow channel enables either external hot air or an internal heat supply to be used.



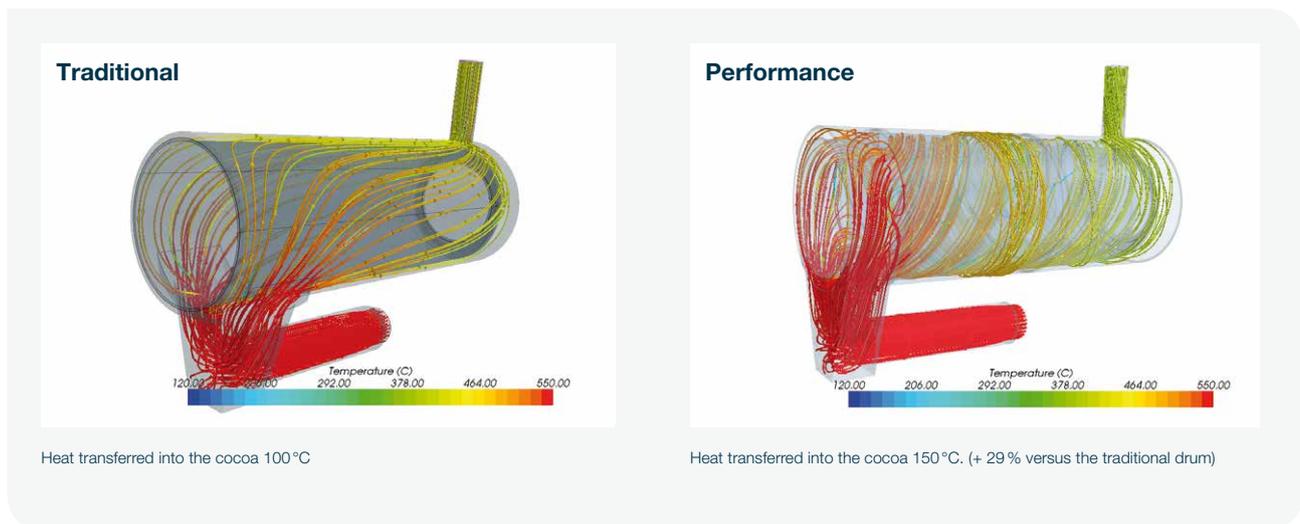
#### **High flexibility allowing.**

- Conductive roasting or convective roasting.
- Conductive/convective roasting (in combination).
- Optimal use of conductive/convective processes.

#### **Optimal recipe differentiation.**

- Switch between conductive/convective roasting.
- Product temperature.
- Off-air temperature control/off-air control.
- Drum pressure control for controlling the refining process.
- Reduced off-air treatment.
- Primarily uses a conductive heating process.

# “Traditional” and “performance” drums. Optimal process control and energy efficiency.



New drum technology and design allows the energy transfer to the product during stewing to be increased by up to 20%. This technology results in reduced energy consumption and a higher throughput. The technology can also be retrofitted in order to improve existing systems.

Industry is being driven more and more by energy efficiency and carbon footprints. Bühler has accepted this challenge and is providing an innovative package that is also available as a retrofit package.

The ingenious “performance” drum routes hot air around the roasting drum. This allows the applied heat transfer to increase by 30%, increasing the relative speed of the hot air and reducing radiation into the room. As a result, the energy transfer to the product can be increased by 20%, leading to faster cycle time during conductive roasting.

Using a recipe with a hot air temperature of 550 °C after the burner as an example, if the mass flow rate of the hot air remains constant, the heat absorbed for the “performance” roasting is up to 23% better compared to the “traditional” design. The “performance” roasting drum can therefore be installed in an existing roaster without too much conversion work required.

## **The retrofit package for the “performance” roasting drum on the Barth Tornado roaster includes the following components:**

- Roasting drum with strengthened spokes.
- Replacement of the entire roasting drum.
- Replacement of isolation (stainless-steel model) with mounted drive shaft and water injection tube.
- New set of running rollers with eccentric shaft (fully mounted).
- New drum bearing with all the required wearing parts (sealing rings, locking plate).
- Installation of the components and change to the air circulation on the existing drum roaster by experienced service engineers on your premises.

# We take your company a step ahead. **Services and expertise across the value chain.**



Bühler operates its own service centers, test facilities and laboratories for the food industry worldwide. Professional tests and analyses allow customers to accurately evaluate the different process steps and their results.

Customized maintenance offers maximum availability for the roasters, retrofitting and reconditioning packages, ensuring that machines are always state of the art. The benefits: customers can produce their products profitably and safely, even with older plants.

A wide variety of processes can be tested and optimized at Bühler's own test facilities in Europe, Asia and the USA. Experienced process engineers carry out pilot trials and test series with the customer prior to a decision on whether to buy.

Pilot plants enable trials to be carried out on a small industrial scale to optimize products or processes. These trials also provide an insight into the required dimensioning of the potential plant. The Bühler central laboratory is the ideal point of contact for demanding analysis tasks and also provides services such as consulting, training and method development.

Product development trials, recipe development for differentiation, and training in the grain roasting process can be carried out in Freiberg am Neckar, near Stuttgart.

As the world's leading provider of technology to the grain processing industry, Bühler is able to provide customized solutions for optimal raw material processing, and to support you in every step of the grist production process. We offer solutions from malt and grain intake, grain storage, transport, cleaning and classification, through to preparation of grains by peeling and color sorting, right up to individual grinding of the malt and other grain-based raw materials.

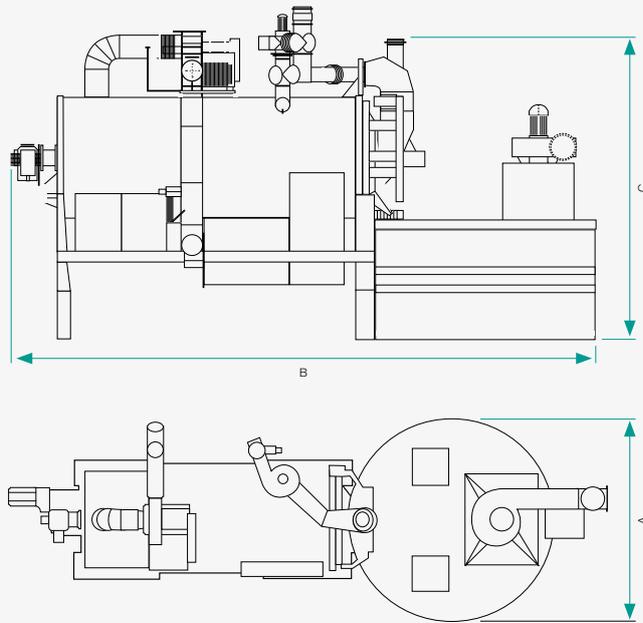
Bühler is represented in more than 140 countries, maintains its own production, development and service locations worldwide and is quickly on site when customers require support. Technicians procure spare parts quickly and install them professionally.

Specially tailored training options enable smooth operation of the machines, allowing you to achieve excellent product quality with optimum throughput. The training courses help improve plant output and keep operating staff abreast of current technologies and safety standards – for labor law regulations as well as food safety.

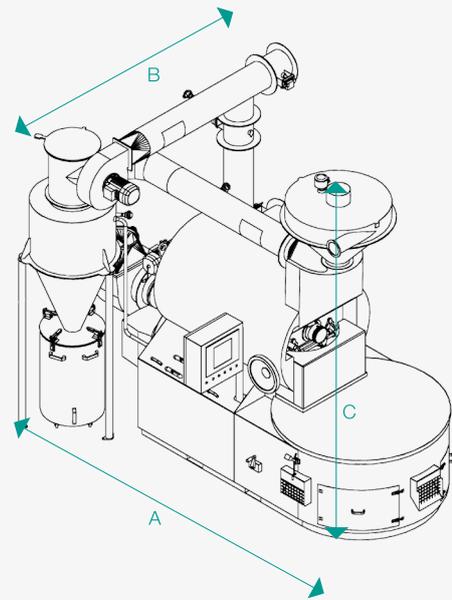
Technical data.

# Barth Tornado N/RSX and Zonda roaster.

**Barth Tornado N/RSX.**



**Zonda roaster 100.**



**Barth Tornado N/RSX dimensions.**

Type	A [mm]	B [mm]	C [mm]
TO 1500 N/RSX + K 3000	3000	5000	4300
TO 3000 N/RSX + K 3000	3000	7000	4300
TO 4000 N/RSX + K 3000	3000	8500	4300
TO 8500 N/RSX + K 3800	3800	9600	5100
TO 10500 N/RSX + K 4500	4500	11800	6100

**Zonda roaster 100 capacity and dimensions.**

Capacity [kg]	
Batch	Grain / Malt 60–100
Dimensions [mm]	
A	4270
B	2550
C	3130

**Barth Tornado N/RSX – drum volume and filling degree.**

	TO 1500 N/RSX	TO 3000 N/RSX	TO 4000 N/RSX	TO 7500 N/RSX	TO 8500 N/RSX	TO 10500 N/RSX
Drum volume [m³]	2.00	2.99	4.02	8.05	9.76	12.16
<b>Caramalt &amp; Crystal malt</b>						
Filling degree [%]	70	70	70	70	70	70
Density [kg/m³]	470–500	470–500	470–500	470–500	470–500	470–500
Batch capacity [kg]	490–650	980–1150	1320–1410	2650–2830	3210–3420	4000–4260
Roasting time [min]	120–170	120–170	120–170	120–170	120–170	120–170
<b>Colored malt</b>						
Filling degree [%]	55	55	55	55	55	55
Density [kg/m³]	600–700	600–700	600–700	600–700	600–700	600–700
Batch capacity [kg]	490–650	990–1150	1330–1550	2660–3100	3220–3760	4000–4680
Roasting time [min]	120–140	120–140	120–140	120–140	120–140	120–140

All data are approximate values. Technical changes reserved.

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