

Sinterstar Mini

The ideal sintering solution for R&D and Proto-typing

INTRODUCTION

Sintering is a fast emerging technology with many new applications in power (and beyond) due to its high temperature capability, unparalleled thermal conductivity and mechanical reliability. As with any new application, fast and flexible Proof Of Concept and prototype build is an industry requirement for process and product development before scaling to manufacturing volumes. Next to the existing sintering solutions for Proto-typing and low to high volumes manufacturing, Boschman has expanded its Sinterstar Product Line with a system specially designed for Research and Proto-typing: **The Sinterstar Mini**.

SOLUTION

The Sinterstar Mini is designed with Universities, Laboratories, R&D departments and Small to Medium-sized Enterprises in mind: Easy and quick to operate, ready for operation within 45 minutes with unseen fast change-over times enable quickly running different processes, tests and products.

A wide variation of products, including Die-to-Substrate, Die-to-Leadframe, Clips, Preforms and Package-to-Heatsink attach applications, can be sintered with dimensions ranging from 2x2x 0.01mm up to 100x100x80mm.

The system is equipped with the same intuitive User Interface and application software as with the larger Sinterstar models, delivering maximum process monitoring and control, extended with a fully programmable temperature profile.

Critical high-volume production capabilities such as our patented Silicone-free Dynamic Insert and N2 technologies in an affordable and compact design with 2 installation options:

1. The Sinter press can be mounted on top of the Controls cabinet or
2. The Sinter press can be placed on a table with the control cabinet next or behind the Tabletop press.



Same as with the larger Sinterstar equipment, the Sinterstar mini comes with **Dynamic Pressure Control (DPC)**, which is a patented technology that has been developed by Boschman to guarantee and equal pressure on every single Die despite assembly and material height tolerance. This technology has proven to be instrumental in Pressure Assisted Sintering. Through the ability to automatically and dynamically control pressure on one or more surfaces while adjusting for height differences and tilt, an accurately defined and homogeneous pressure can be applied on defined surfaces which is crucial to ensure that the sinter bond line becomes homogeneous in thickness and density. Controlled pressure is needed to create dense and well-structured sinterbonds, ensuring good performance and high reliability. For more detailed information wrt Dynamic Pressure Control, see **TDS - Dynamic Pressure Control**

MAIN SYSTEM SPECIFICATIONS

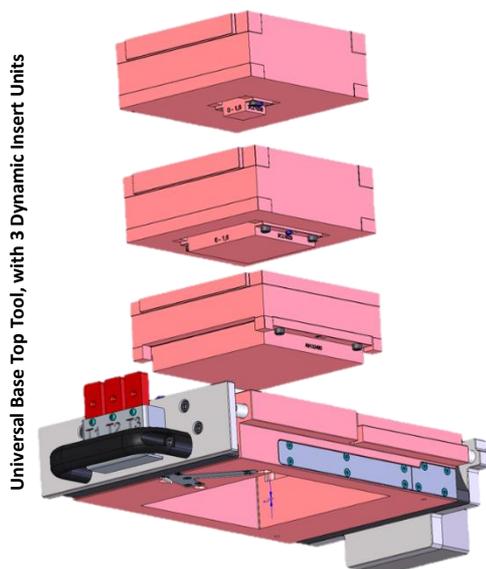
- Effective sinter area: 100x100mm;
- Product thickness range: 0,01-80 mm;
- Sinter temperature up to 320°C;
- Insert force range: 25N – 196kN;
- Programmable sinter pressure, time and temperature
- Universal Base Tool set for one Dynamic Insert;
- Height adjustable Color touchscreen / HMI;
- Advanced and precise process control with data export functionality;
- Micro Controlled Environment (N2);
- Vacuum Controlled Environment (optional);
- Easy product loading by means of drawer at the frontside;
- Bottom heater/cooler plate is temperature controlled and programmable. Allows heating and cooling of product with adjustable ramp under N2;

FACILITY SPECIFICATIONS

Press Unit	Value
Weight	390 Kg
Dimensions (W*D*H)	472x954x1106 mm
External connections:	
▪ Cooling Water Pressure	Max. 6Bar, Minimum differential 3Bar
▪ High Pressure Nitrogen	75-80Bar
▪ Compressed Air	5 Bar
Control Cabinet	Value
Weight	150 Kg
Dimensions (W*D*H)	582x1229x805 mm
Power Supply	400V, 3 Phase (12KVA)



UNIVERSAL BASE TOOL SET



The **Universal Base Tool set** offers great flexibility and is perfect for Research and Quick prototyping purposes. For a unique product only dedicated inserts and alignment plates are required. These parts are easy and fast exchangeable.

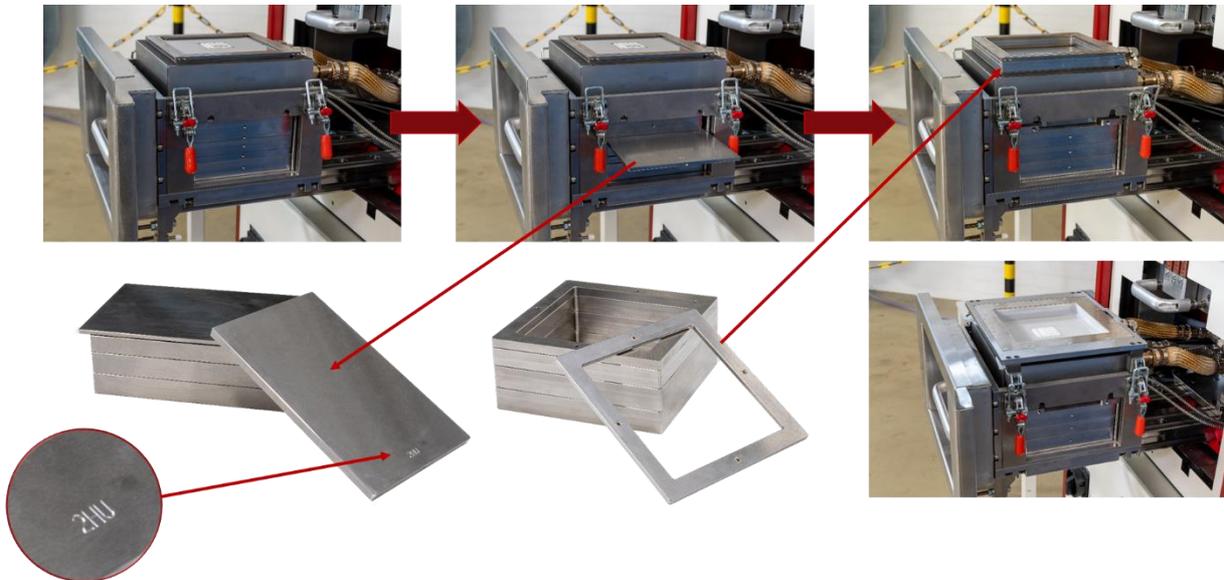
The Universal Base Tool Set consists of:

- Base Top tool for 1 Dynamic Insert in a slide
- Base Bottom tool including product jig with N2 supply
- Product height conversion set from 0,01-80 mm
- 1x film roll, 50um thickness, 120 mm width, 100m length

3 standard Dynamic insert Units are separately available with the following dimensions: 22x22mm, 66x66mm and 100x100mm. Golden samples for pressure uniformity test are included.

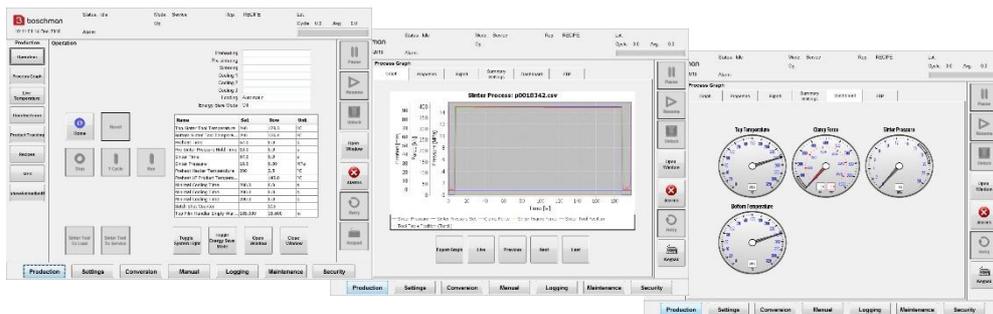
Product Height conversion

Product thicknesses the Sinter star Mini can handle range from 0,01mm up-to 80 mm tall. By means of a set of height conversion plates below the sinter area and conversion frames around the sinter process area, the right set-up can be easily configured . All plates and frames are labelled to enable quick set-up and prevent mistakes.



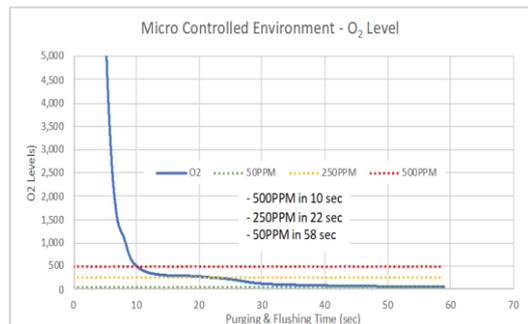
Process capabilities

The Sinterstar mini operates on the same application software as the larger systems; with the same intuitive user interface, providing the same **easy recipe set-up and live process monitoring** features

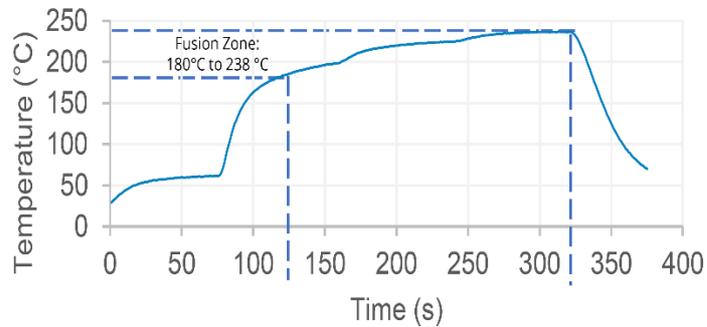


Dashboard with process parameters and real time process graph

Also the **Micro Controlled Environment** functionality to enable sintering of Cu area products. I.e. lead frames, Cu-substrates (DBC and AMB) is included. In the Micro Controlled Environment, a single sheet of PTFE film is vacuumed on the loading area to create a controlled O2 environment by flushing N2 inside the sealed chamber. An O2 level below < 50 PPM can be reached. Ideally, The controlled environment is active during the full cycle; pre-heating, sintering and cooling.



A feature that is new, is the possibility to program a **temperature profile with adjustable heating and cooling ramp**. This allows heating and cooling of products with adjustable ramp under N2 and enables the use of presurreless pastes. See example:



CONCLUSION

The Sinterstar Mini is a unique and versatile sintering system in a very compact design with process capabilities beyond production sintering systems making it an ideal solution for Research and Development, Proof Of Concept and Proto-type manufacturing.