

Печи для MIM-приложений NRA CDB

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Россия +7(495)268-04-70

Казахстан +(727)345-47-04

Беларусь +(375)257-127-884

Узбекистан +998(71)205-18-59

Киргизия +996(312)96-26-47

эл.почта: nme@nt-rt.ru || сайт: <http://nabertherm.nt-rt.ru/>

Furnaces for MIM Applications

Metal Injection Molding (MIM) is a manufacturing process that allows for the rapid and cost-effective production of small, geometrically complex, metallic components in large quantities.

In MIM, several identical parts are typically produced in a single operation using a metal-based feedstock, which is a metallic powder with a binder system, injected into a mold by a molding machine.

In the subsequent debinding process, this green part loses a large amount of the binder, which was needed only for shaping, and becomes what is known as the brown part. Debinding can be carried out in several ways, either thermally in an inert atmosphere or under hydrogen, catalytically in a nitric acid-nitrogen atmosphere, or in a system containing water or solvent. The basis of a thermal or catalytic debinding furnace is a gas tight hot-wall retort furnace from the NR product line.



In the subsequent combined debinding and sintering process, which takes place in a process gas atmosphere or in a vacuum, the brown part is sintered into the finished part.

Due to the high sintering temperatures, this process step is typically carried out in a cold-wall retort furnace from the VHT model series. The furnace can be tailored specifically to the material for this process step in various configurations. For sintering stainless steels under a hydrogen atmosphere, furnaces with heaters and insulation made of molybdenum and heating elements made of tungsten, for example, are used. Furnaces with graphite heaters and insulation made of graphite felt are excellent for low-alloy steels that can be sintered in a non-reducing process gas atmosphere.

The Nabertherm MIM product lines, consisting of NR for debinding and VHT for sintering, are extremely flexible and compatible. Four furnaces each are available for thermal and catalytic debinding and sintering, all of which are optimally matched to each other in terms of size. As a result, the charge can be transferred directly from the debinding furnace to the sintering furnace or can also be manufactured with different furnace sizes independently of working or shift times.

Retort furnace VHT 40/16-MO H₂ MIM

Catalytic debinding furnace	Thermal debinding furnace ¹	Solvent debinding system ²	Sintering furnace ³	Volume in l	Work space in mm			Quantity levels	Number of shelves 170 x 250 mm total (level)	Shelves Work space in m ²
					w	d	h			
NRA 40 CDB	NR 40/11..	EBA-200NT EDA-200NT	VHT 40/15 .. MIM	40	340	500	240	6	24 (2x2)	1
NRA 80 CDB	NR 80/11..	EBA-250NT EDA-250NT	VHT 80/15 .. MIM	80	340	750	320	8	48 (2x3)	2
NRA 160 CDB	NR 160/11..	EBA-450NT	VHT 160/15 .. MIM	160	500	680	480	12	96 (2x4)	4
NRA 320 CDB	NR 320/11..	EBA-900NT	VHT 320/15 .. MIM	320	680	750	640	16	192 (4x3)	8

¹IDB (debinding in non-flammable process gases), H₂ (debinding in hydrogen)

²Models from Lömi GmbH, designed to work together with Nabertherm sintering furnaces, specifications according to Lömi GmbH

³MO: Molybdenum, GR: Graphite



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