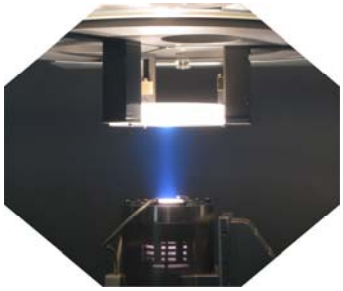
HIGH END SOLUTIONS FOR HIGH END PRODUCTS



NTG
Since 1968 NTG Neue Technologien GmbH & Co. KG is an innovative designer and manufacturer of products for mechanical engineering, special machines and appliances. Located in the Frankfurt/Main area, actually approx. 90 employees are working at NTG.

NTG is a worldwide operating mechanical engineering company. Made in Germany is not just an empty phrase for us. No difference if simple job order parts or complex procedural plants, everything is manufactured inhouse. NTG co-operates successfully with customers in Industry and Research. Our activities concentrate on Design, Manufacturing, Assembly and Commissioning of parts or complete plants mainly in the fields of particle accelerators, IBF technology, vacuum technology, nanotechnology and components for nuclear power plants, as well as special custom-made plants for industrial clients. In our characteristic as designer of custom made solutions we are always looking for new challenges.

Do not hesitate to describe us your problem, even if it does not fit into the categories listed above. NTG's production equipment is according to the high requested standard and is added by our production independent and TÜV-authorized Quality Control Department. It is equipped with 3D gauging machines. All processes are controlled by an ERP-System. We dispose of valid approvals according to HP0 and DIN/ISO 9001, DIN ISO 13485 as well as KTA 1401 and SVTI. Our Technical Engineering and project planning team is provided with the following 3D-CAD and CAM System:

- Mechanical Engineering: Solid Works 2010, ProE, CAM Works
- Electrical Engineering:VisiWinNET(.net-Interface), TwinCAT or Siemens S7, TreeCAD.

NTG is specialized on stainless steel. With our experience and our large feedstock we are able to serve our customer immediately if required.

IBF
Since 1991 NTG is engaged in IBF-technology. IBF-Technology is needed when the required quality of optical surfaces can not be achieved by using conventional polishing techniques. Our Customers are the world leader in fabrication of high performance optics. Whereas in the past the use of technology was limitated in producing stepper objectives for the semiconductor industry recently a growing demand of this technology even in the traditional optic industry can be recognized. Actually ten(!) different standard types of IBF-plants are available at NTG for different sizes and applications. NTG has sold the largest number of IBF plants worldwide and offers the widest range of plant types. For substrates between 5mm and 2000mm in diameter we have well designed, approved and ready to build solutions available.

IBF-100:
The IBF-100 is the smallest machine of NTG´s IBF-family. Compact design, plug and play installation make it a very flexible tool for high end manufacturing. The IBF-100 is a consistent advancement of our bigger plants IBF-300, IBF-450 and IBF-700. Parts with a diameter of 5-70mm (100mm by direct loading), max. part thickness of 45mm and max. contact angle of 65° can be treated.

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IBF-200:
The IBF-200 was launched in 2013 and is a plant for nanometer exact correction of small to medium sized optical surfaces. In the 200-S configuration it is possible to process substrates with a contact angle up to 90°. Beside this direct Ion beam smoothing and Ion beam etching can be performed on this plant too.


IBF 100


IBF 300


IBF 300

IBF-300 & IBF-450:
The IBF-300 and 450 were the first types of IBF plants built at NTG. Designed for diameters up to 300 resp. 450mm a height up to 120mm and weights up to 50kg these plants are perfect tools for the fabrication of high end lenses. For more than 20 years some plants of this type are running in an industrial process partly in 24/7. The system is almost free of wear parts.

IBF-700:
The IBF-700 is for workpieces up to 700mm in diameter approx. 200mm height and a weight up to 100kg. Its main use is in the semiconductor industry.


IBF 700

IBF 1500

IBF-1500:
The IBF-1500 is for workpieces up to 1500mm in diameter and a total weight up to 1000kg. It is in use since 2012, mainly for polishing error correction of large mirrors used for astronomical applications and has already demonstrated its capability as production facility.

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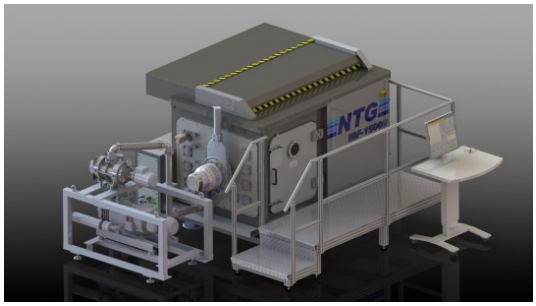
IBF-1500R:
The IBF-1500R is a procedural plant for nanometer exact correction of rectangle optical surfaces (f.e. synchrotron mirrors). The plant is equipped with a high speed pumping system to minimize loading and unloading times.


IBF 1500R


IBF 1500R

IBF-2000:
The IBF-2000 is for workpieces up to 2000mm in diameter and a total weight up to 1500kg ! It is actually the biggest NTG-IBF plant and is mainly used for polishing error correction of large mirrors used for astronomical applications.


IBF 2000


IBF 2000

Advantages of NTG-IBF Process
- Contactless process - no signs on the surface
- no induced stress on the surface
- almost any geometry can be treated
- large spectrum of processable materials
- acquisition costs comparable with MRF plants
- low operating costs
- no abrasives are necessary
- nearly no wearing parts
- less cleaning exprenses (for parts and machine)
- low maintenance
- surface quality PV < λ /10 to λ/50 achievable (depending on the requirements of quality & process speed)
- surface quality PV < λ/100, rms < 1nm reachable without additional investments
- Know-How resulting of more than 20 years IBF-treatment

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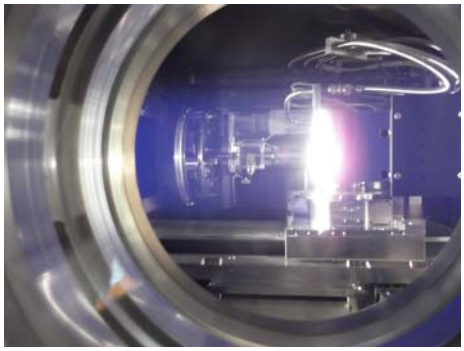
IBE

NTG builds IBE plants to transfer pattern and structure from photo resist to the substrate. This etching process is for example used for fabricating diffractive optical elements, which have a series of technological advantages over "classic" refractive optics. The IBE-plants are available with either a Kaufman ion source or an RF-type ion source. Both ion sources allow to etch substrates with a diameter of 2" up to 16", whereas reactive ion beam etching (RIBE) as well as non-reactive ion beam etching (IBE) techniques can be applied. The plants are equipped with load locks which allow transferring substrate into and out of the plant without breaking the vacuum in the process chamber, which is a very critical parameter of the etching process.



IBE 215 in progress

IBE 215

NTG
Neue Technologien GmbH&Co. KG
Im Steinigen Graben 12-14
D-63571 Gelnhausen

Tel.: +49-6051-6003-0
Fax: +49-6051-6003-55
e-mail: info@ntg.de
www.ntg.de

NTG in China:
OEC
Mr. Shi Zhenxia/ 师 振 峡
desino zhenxia Tech.Co.,Ltd.
北京德华振峡科技有限公司
Tel.: +86-21-6148-2080-12
Fax: +86-21-6148-2081
www.oec-shanghai.com

NTG in India:
MEC
Materials, Equipments and Components
4B-02, Nandi Gardens
J P Nagar IX Phase
Bangalore - 560062
INDIA
tel. +91 9964850908
e-mail: mecnoida@gmail.com

NTG in Japan:
Enable KK
Mr. Hideki Ogawa
Kawaguchi Center Bldg. 5F,
4-1-8 Hon-cho
Kawaguchi, Saitama 332-0012
Tel.: +81-48-227-4688
Fax: +81-48-227-4622
www.enablekk.com

NTG in Korea:
MSR
Mr. Mason Song
#1106 Hanshin Cylux West,
716 Suseo-Dong,
Gangnam-Gu, Seoul
Korea (zip. 135-560)
Tel.: +82-2-554-2350
Fax: +82-10-5314-2001
e-mail: masonsong@msr.co.kr
www.msr.co.kr

NTG in Turkey:
OPTOMEK
Mr. Mutlu Bayar
Mustafa Kemal Mah. 2142,
Sokak No: 9/2,
06520 çankaya-ANKARA
TURKEY
Tel.: +90-312-219-44-22
Fax: +90-312-219-44-33
e-mail: mbayar@optomek.com.tr
www.optomek.com.tr