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CYCLONE® 70

CHOOSE WITH CONFIDENCE

PROTECT +
ENHANCE +
SAVE LIVES

RADIO
PHARMA
SOLUTIONS

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The only proven technology

WORLD PREMIERE

IBA successfully developed the first 70 MeV multi-particle compact cyclotron with full specifications at high beam power in 2005. Ever since, IBA is the only company able to provide this level of expertise and success with a 70 MeV cyclotron.

The design is based on the well-known Cyclone® 30 and the IBA expertise in high energy cyclotrons (like Proton therapy cyclotron used at 230 MeV) that has been in routine operation around the world for radioisotope production and research since 1986.

GLOBAL LEADER

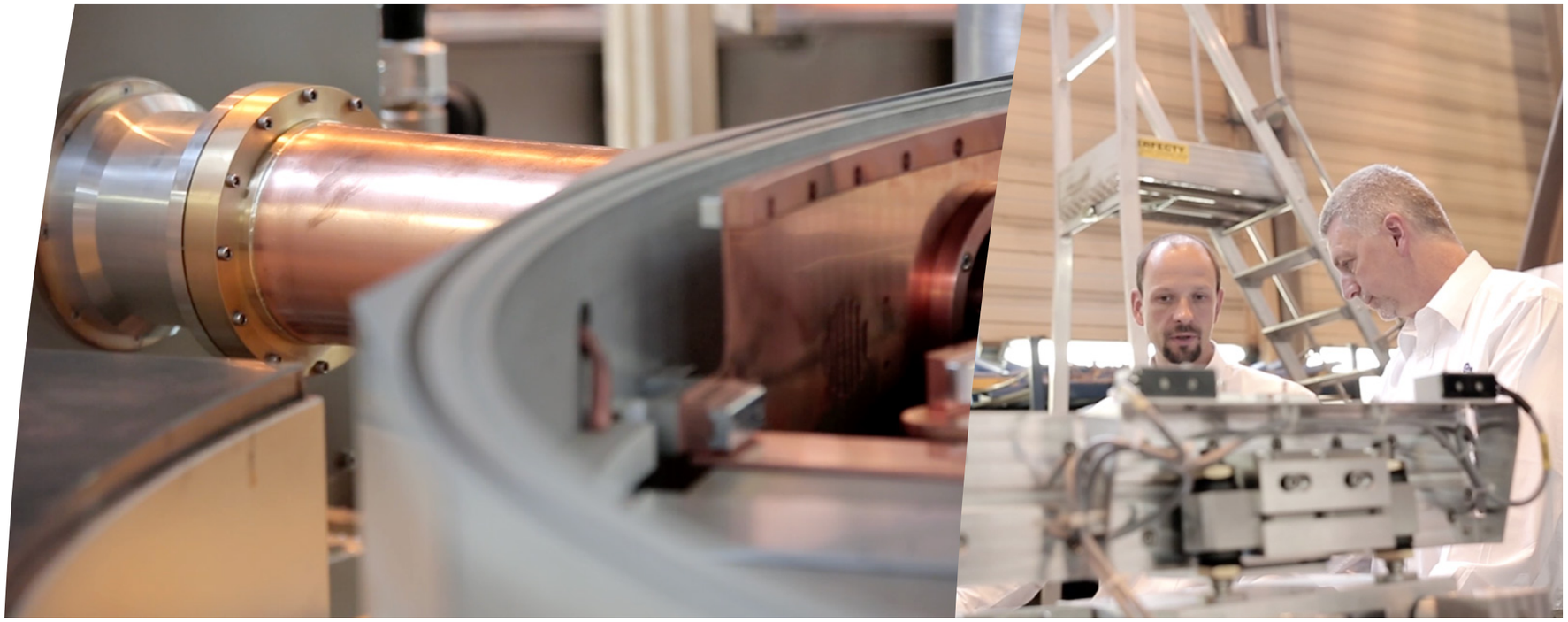
With more than 30 high energy cyclotrons installed worldwide, IBA is the leader in this segment. This confirms the very high reliability and effectivemess of IBA's simple and unique design.

HIGH FLEXIBILITY

The Cyclone® 70 family offers wide flexibility both in accelerated current and energy given a large flexibility for production.

Cyclone® 70
highly efficient and reliable

HIGH ENERGY FOR SPECIFIC APPLICATIONS



ADAPTED TO YOUR PRODUCTION NEEDS

Thanks to the 70 MeV proton, two important PET generators parents can be produced, namely ^{82}Sr & ^{68}Ge.

The Cyclone® 70 offers also variable energy down to 30 MeV allowing access to other nuclear medicine isotopes: ^{111}In, ^{123}I, ^{201}Tl...

DUAL BEAM EXTRACTION

Maximum efficiency is achieved through the simultaneous bombardment of two targets or the dual production of the most frequently used radioisotopes.

MINIMAL EXPOSURE

Exposure to personnel and activation of equipment is minimized thanks to the use of negative ion acceleration technology. Radiation exposure to personnel is drastically reduced, even during maintenance, thanks to the design optimization and the use of low activation material.

MAXIMUM UPTIME, MINIMAL RUNNING COSTS

The unique magnet design, derived from patented IBA “deep valley” technology, minimizes power requirements and delivers considerable savings in operating costs. The proprietary RF system assures highest stability and system availability.

AUTOMATION

The unique automation of Cyclone® 70 has been carefully designed to be user-friendly, flexible and reliable. This includes full automation of the cyclotron and targets.

From cyclotron start-up to beam on target the routine operation of the cyclotron is automated using beam libraries.

PROTON

CYCLONE® 70 P

The Cyclone® 70 P is an optimized cyclotron for high energy and high current production of proton beam. Protons are accelerated in the negative ion mode and extracted with two stripping systems to feed simultaneously two target stations.

INDUSTRIAL PRODUCTION

Optimized proton-only cyclotron with high reliability, efficiency and uptime for industrial production of ^{82}Sr and ^{68}Ge.

World
N°1

IntegraLab® from project to production

Acquiring a cyclotron is only the first step in a complex project. Multiple processes and highly sophisticated equipment must be integrated into a cost effective and performant solution.

For many years, IBA's large team of experts in equipment and radiopharmacy has been providing close support to realize fully-compliant GMP facilities. IBA offers a comprehensive range of support equipment engineering, installation and commissioning services required to design a new facility. IBA provides detailed drawings and recommendations for room dimensions and design, location, size and number of services required for the Cyclone® 70, beam lines and targets, taking into account the specificity of high-energy and high-intensity beams.

Cyclone® 70 installed over the world

IBA IS THE ONLY COMPANY ABLE TO PROVIDE A HIGH LEVEL OF EXPERTISE AND SUCCESS WITH THE INSTALLATION AND OPERATION OF A 70 MEV CYCLOTRON. ALL OVER THE WORLD, IBA CYCLONE® 70 USER ARE

"The collaboration with IBA on this project has been great from the start. IBA worked closely with our management team to provide the timely information needed to complete this complicated project ahead of schedule by several months. Our expectations have been exceeded in both the technical support and equipment specifications. We definitely recommend IBA for the supply of high energy cyclotrons."

John Zehner, Zevacor Molecular's Executive Vice President and Chief Operating Officer

INDIANA, USA

Cyclone® 70 proton only, 2015
6 Vectio beam transport lines
2 standard solid target station
Building design

ARIZONA, USA

Cyclone® 70 proton only, 2018
6 Vectio beam transport lines
6 standard solid target station
Building design

IBA CYCLONE® 70
IBA YOUTUBE CHANNEL:
https://goo.gl/dcHnPe

"We selected IBA for its leading technology and unique know-how in developing high energy 70 MeV cyclotrons. IBA's expertise will allow us to reach our objectives of supplying medical isotopes for the diagnosis and treatment of critical illnesses worldwide."

Dr Sheldon Trubatch, AZI Corporate Secretary

MOSCOW, RUSSIA

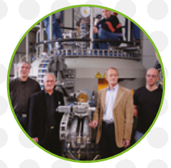
Cyclone® 70 proton only, 2016
4 Vectio beam transport lines
2 standard solid target station
Building design

"IBA was selected for its leading technology and unrivalled know-how in developing high energy 70 MeV cyclotrons. We can rely on IBA's expertise to reach our objective to supply the world with medical isotopes for the diagnosis and treatment of critical illnesses."

Dr Alexander Khasin, CEO of the Centre for Development of Nuclear Medicine

NANTES, FRANCE

Cyclone® 70 XP, 2005
6 Vectio® beam transport lines
Customer target for neutron capture
4 standard solid target station
A 3 beam-line research vault

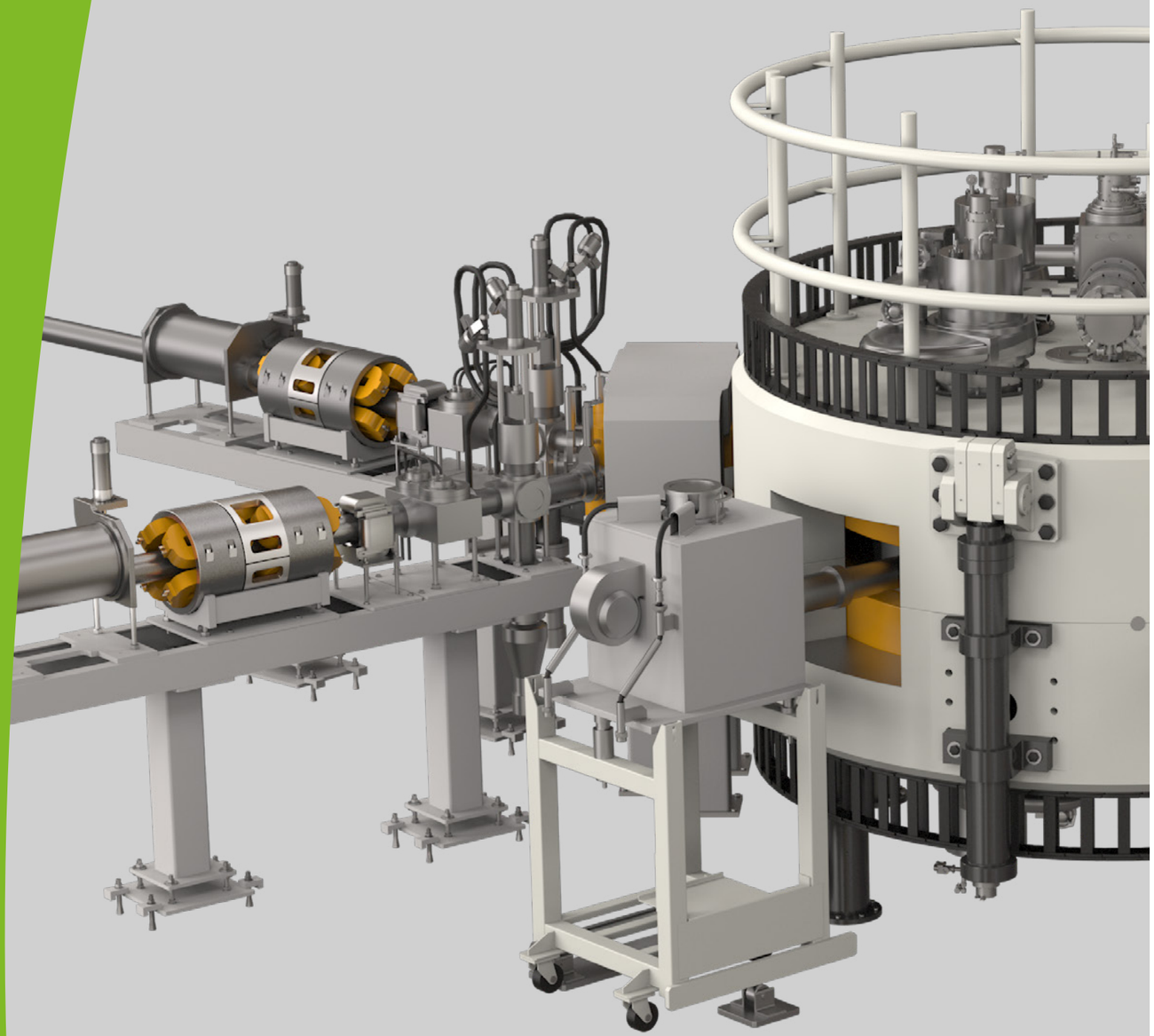


"We have installed a high energy (70 MeV) and high intensity (750 µA) cyclotron for the production of originals and innovating radio nuclides for research in nuclear medicine.
We considered that IBA, recognized for its ability in the design and the realization of medical use cyclotrons, has all the assets to conceive, assemble and install this new type of last generation cyclotron."

Prof. Jean-François Chatal, Nuclear medecine professor, Cancer research centre Inserm-university Nantes-Angers.

Technical specifications

	Cyclone® 70 Proton
High capacity	
Energy	30 - 70 MeV
Maximum proton intensity	750 µA
Maximum deuteron intensity	
Maximum alpha intensity	
Target flexibility	
Simultaneous extracted beams	2
Exclusive target system	
Solid target system	10mm to 30mm dia collimators. Capsule or plated target
Magnetic structure	
Number of sectors	4
Hill field	1.6 Tesla
Directly coupled RF System	
Number of dees connected at the center	2
Harmonic mode (proton)	4
Frequency (fixed)	62MHz
Amplifier power	100 kW
State of the art of Injection system	
Type of source (external)	Multicusp
Vacuum system	Turbo's
Injected H-current	10 mA (H-)
Compact design	
Total weight	140 tons
Cyclotron dia	4x3.8m
Minimal running cost	
70MeV standby	60 kW
70MeV using 2 beam lines simultaneously	350 kW
HVAC load (typ)	
Cyclotron room	6 kW
Power supply room	40 kW
Target room	2 kW
Low cooling requirements	
Temperature	6°-16°
Heat load capacity	450 kW
Clean vacuum	
Cyclotron Cryo-pumps	6



3D view of the Cyclone 70 P with exit port switching magnet and beam line installed.

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ABOUT IBA

IBA (Ion Beam Applications S.A.), is a cancer diagnostics and treatment company and the worldwide technology leader in the field of proton therapy. The company's expertise lies in the development of next-generation proton therapy technologies and radiopharmaceuticals that provide oncology care providers with premium quality services and equipment, including IBA's leading fully-integrated IntegraLab® system.

ABOUT IBA RADIOPHARMA SOLUTIONS

Based on longstanding expertise, IBA RadioPharma Solutions supports hospitals and radiopharmaceutical distribution centers with their in-house radioisotopes production by providing them global solutions, from project design to the operation of their facility. In addition to high-quality technology production equipment, IBA has developed in-depth experience in setting up GMP radiopharmaceuticals production centers.

ABOUT INTEGRALAB® AND SYNTHERA®+

IntegraLab® is a fully integrated solution combining equipment and services for the development of Radiopharmaceutical Production Centers. IntegraLab® includes the building designed with full regulatory compliance and the selection, integration, supply and installation of suitable high-technology equipment to match your radioisotope production goals.

Synthera®+ is a multi-purpose automated synthesizer for the production of ^{18}FDG, other compounds [^{18}FCH, ^{18}FLT, Na^{18}F, ^{68}Ga peptides ...]. This smallest available module on the market is designed to accommodate a wide range of radiochemistry processes.

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