

# Best Cyclotron Systems and Best Theratronics Ltd, Members of TeamBest Companies, Unveil a New Unique Cyclotron for Isotope Research and Production – the 28 MeV.

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Drawing on more than 50 years in medical equipment manufacturing expertise, this innovative new product offers a cost-effective alternative to both short- and long-lived medical isotopes. A cyclotron uses a combination of magnets and radio frequency electric fields to accelerate ions to velocities high enough to create isotopes. Best Cyclotron Systems (BCS) and Best Theratronics Ltd (BTL) have a unique cost-effective technology to manufacture five types of cyclotrons: 14 MeV (B14), 25 MeV (B25), 28 MeV upgradable to 35 MeV (B28), 35 MeV (B35) and 70 MeV (B70). These cyclotrons will focus on isotopes used in Positron Emission Tomography (PET), Single Photon Emission Computed Tomography (SPECT) and Therapy by virtue of their respective energies.

This unique processing system, available from TeamBest, can be used with BCS's B14, B25 and B28 Cyclotrons or other suppliers' cyclotrons to produce enough  $Tc^{99m}$  to adequately meet the clinical needs of large urban centers. The long-term supply of  $Tc^{99m}$  for nuclear medicine is no longer dependent on reactor-supplied material. The TeamBest system can use the existing, yet small, cyclotron infrastructure or with new cyclotron sites, all for a much lower incremental cost compared to alternative systems and other isotope production technologies.

The 28 MeV (B28) is an  $H^-$  cyclotron that has extraction energies of 28 and 20 MeV. The extracted beam current is 400 microamperes and can be extracted simultaneously in any split ratio from two extraction ports on opposite sides of the cyclotron. The opposing beam ports are each separated into a 20 and 28 MeV beam line.

The B28 is the Cyclotron of choice for research institutions requiring a broad range of radioisotopes and a regional radiopharmacy that supports PET imaging centres as well as providing SPECT molecules. Since the B28 can be upgraded to 35 MeV and up to 1000 microamperes current, the higher energy and higher current allows even more radioisotope production. In addition, these upgrades can be implemented in the field.

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## **Best 28 MeV Cyclotron Specifications:**

**Ion Source:** External ion source (4 mA DC cusp source)

### **Type of Cyclotron:**

- Negative hydrogen ion (H<sup>-</sup>)
- Four extracted beams
- On Cyclotron targetry
- B28 may be field upgraded to B35

**Beam Current:** Up to 400 uA extracted beam current

**Beam Energy:** Extraction energy fixed at 28 and 20 MeV

### **Beam Line:**

#### **Fixed energy extraction**

- Two 20 MeV beams one on either side of cyclotron
- Two 28 MeV beams one on either side of cyclotron

#### **Beam Transport**

- 20 MeV beams directly onto production targets
- 28 MeV beam lines, include quadrupoles

#### **Beam Diagnostics**

- 20 MeV beams, use target collimation and isolation
- 28 MeV beams, beam stop, collimators

### **Isotope Production Capabilities for B25/28/35:**

**Iodine-123:** Low dose imaging agent, replacing I<sup>131</sup>

**Indium-111:** Blood cell labeling

**Gallium-68 (generator):** Blood-brain barrier integrity, tumor localization

**Thallium-201:** Myocardium functional assessment

**Krypton-81m (generator):** Gas for ventilation imaging or in solution for perfusion imaging

**Plus, all isotopes produced by the B14 including:** Carbon-11, Nitrogen-13, Oxygen-15, Fluorine-18 (aqueous & gas), Copper-64, Iodine-124, Gallium-67, Technetium-99m and Palladium-103

The new B28 is far superior to the 24 MeV Cyclotron and is capable of producing a wider variety of isotopes, as well as higher quantities per hour. This will be preferred by academic researchers and commercial users because of these advantages and the ability to upgrade in the future. BCS is planning to begin production of the B28 in the next quarter and will make it available for sale during Summer 2013.

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**www.TeamBest.com • www.BestProton.com**  
**www.BestCure.md • www.Kitsault.com**  
**www.Theatronics.com**

