



ADVANCED  
CYCLOTRON SYSTEMS, INC.

Built for versatile,  
cost-effective production.

# ADVANCED TR-24 CYCLOTRON SYSTEMS

200  $\mu$ A

300  $\mu$ A

500  $\mu$ A

750  $\mu$ A

The TR-24 is a medium variable energy cyclotron that bridges the gap between PET and SPECT cyclotrons. The wide energy range allows for the production of SPECT isotopes that in the past was only achievable from 30 MeV accelerators.

## VARIABLE ENERGY: 18-25 MeV

The TR-24 variable energy capabilities provide flexibility by allowing users to adjust the beam energy in order to optimize the radionuclidic purity and yield of the radioisotope being produced. The wide energy range of the TR-24 makes this accelerator an ideal choice for a multipurpose cyclotron facility.

## TARGETRY

ACSI can provide a wide variety of PET and SPECT targets that are compatible with the TR-24 beam power and energy. Fully integrated beamlines and automated transfer systems for both PET and SPECT radionuclides are available in standard and custom configurations.

## HIGH CURRENT

The TR-24 can be easily upgraded in the factory or at the user's site from the standard 200  $\mu$ A to 300  $\mu$ A, 500  $\mu$ A or 750  $\mu$ A. This allows the user to greatly expand their radionuclide production capabilities as needed.

## MODULAR VACUUM SYSTEM

The ion source, extraction probes, beam lines, and targets can all be isolated from the main vacuum tank by gate valves. This allows for servicing without breaking the cyclotron tank vacuum, resulting in low dose for routine maintenance of the ion source and extraction foils. The TR-24 uses an ultrapure cryogenic vacuum system that completely eliminates oil contamination, while requiring very little maintenance.



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## The TR-24 at a glance:

TR-24	
Accelerated Ions	H <sup>-</sup>
Extracted Ions	H <sup>+</sup>
Extraction Method	Carbon Foils
Extracted Energy	18 - 25 MeV
Extracted Beam Current	Protons: 200 µA, 300 µA , 500 µA or 750 µA
Acceleration Plane	Horizontal
Extraction Ports	2
Standard Extraction Probes	Single carbon foil
Optional Extraction Probes	Carousel type, multiple foils per carousel, which allows automated switching between extraction foils
Dual Beam Operation	Dual irradiation at any split ratio



## BEAMLINES

Different beamline configurations are available for the TR-24 cyclotron to suit specific facility layouts or operational demands. The TR-24 can be configured with up to six beam lines.

## TARGETRY

PET targets are mounted to a target selector which allows target position adjustment during beam irradiation.

SPECT production occurs on high current solid or gas target stations. These target stations are designed for high radionuclide production rates and require little routine maintenance in order to keep operator dose low.

Available Equipment	PET Targets	SPECT Targets
Liquid Targets	$^{18}\text{F}$ , $^{13}\text{NH}_3$ , $\text{H}_2$ , $^{15}\text{O}$	N/A
Gas Targets	$^{11}\text{CO}_2$ , $^{11}\text{CH}_4$ , $^{18}\text{F}_2$ , $^{15}\text{O}_2$	$^{123}\text{I}$
Solid Targets	$^{124}\text{I}$ , $^{64}\text{Cu}$ , $^{89}\text{Zr}$	$^{99\text{m}}\text{Tc}$ , $^{111}\text{In}$ , $^{67}\text{Ga}$
Automated Transfer Systems	Available for all liquid, gas, and solid targets	Available for all gas and solid targets

The TR-24 forms the basis of Canadian CycloTec™ network that can serve as alternative source of  $^{99\text{m}}\text{Tc}$ , capable of supplying this radionuclide to over 90% of the Canadian population.

