



# ACT-LC

## HPGe Detector for Actinide Lung and Whole Body Counters



Nuclear



Healthcare



Homeland  
Security  
& Defense



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Education



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Manufacturing

### KEY FEATURES

- Specialized detector system for difficult-to-detect internally deposited actinides
- Closely-spaced detectors with low background
- Excellent resolution and high-sensitivity at low to moderate energies
- Operates in all attitudes from vertical upright to vertical downlooking

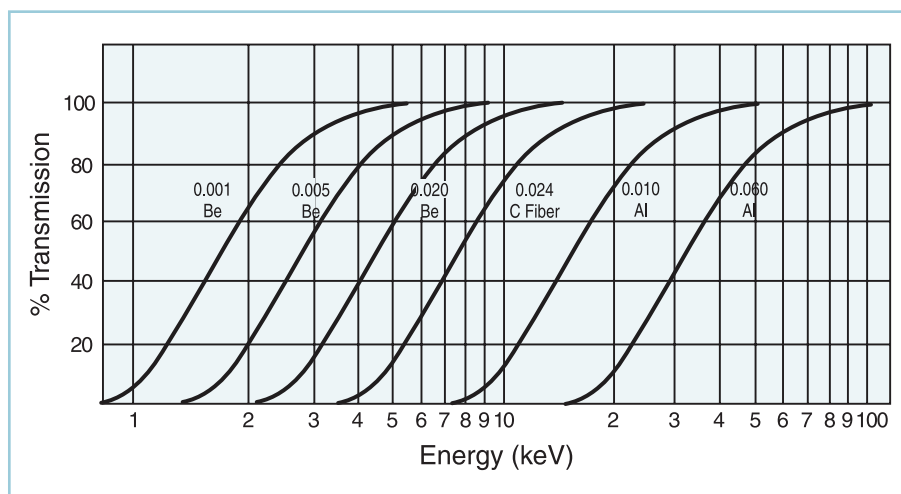
### DESCRIPTION

The CANBERRA ACT-LC Ge Detector was designed specifically for the detection of internally deposited actinides, particularly uranium, plutonium and americium. Because of the low gamma-ray abundance from uranium, and the low energy of the x rays from plutonium, which emits few gammas, this application demands a very specialized detector system. To achieve desired sensitivities, two large area Broad Energy Germanium (BEGe) detectors are placed in virtual contact with the subject in close proximity to the lungs. The measurement must be carried out in a shielded room. For optimum results, the detectors must be closely spaced, the detector background must be low, the resolution must be good, and the sensitivity of the detector must be high over the energy range of interest (13-20 keV for Pu, 60 keV for Am, and 140-190 keV for U). The ACT-LC Ge Detector from CANBERRA provides all this performance and more.

### DETECTOR ELEMENT

CANBERRA pioneered the BEGe detector element which is used in the ACT detectors. The BEGe detector is a large area detector with a thin window contact for high sensitivity at low energies. Because of the device geometry, the capacitance is low, and this results in excellent resolution at low to moderate energies.

*(continued on next page)*



Window Transmission Characteristics

## MULTI-ATTITUDE CRYOSTATS

### Electric Cooling

The ACT-LC is fully compatible with the CANBERRA Cryo-Pulse® 5 plus (CP5-PLUS) electrically cooled cryostat. This provides a completely liquid nitrogen free solution with the same guaranteed resolution performance. The CP5-PLUS is an all-attitude cryostat allowing maximum flexibility in position of the detector. The audible noise is extremely low which makes it perfectly suited for use in confined spaces. Water cooling of the CP5-PLUS coldhead is available as option to prevent heat dissipation inside the measurement room. For more details, please refer to the CP5-PLUS specification sheet in the cryostat section on the CANBERRA website.

### Liquid Nitrogen cooling

In order to provide the flexibility to allow optimum placement of detectors on the chest of the subject under study, the ACT-LC detector is able to operate in multiple attitudes from vertical upright to vertical downlooking. The ACT-LC, with three day holding time, does not require an automatic LN<sub>2</sub> refill system. Such systems are available, however, if desired.

## LOW BACKGROUND MATERIALS

The detector chamber and the internal cryostat hardware are made from stainless steel and high purity copper respectively. The window is made from a space-age carbon filament composite, which provides strength, safety and lower background than is possible with Be windows (see Window Transmission Characteristics). Be windows are available optionally.

## ADDITIONAL FEATURES

Optional shielding may be used around ACT-LC detectors to reduce the direct and scattered background for potassium-40 and other NORM from the subject and surrounding materials.

## SPECIFICATIONS

### DETECTOR

Model	BE6530
Area (cm <sup>2</sup> )	65
Thickness (mm)	30
Resolution [eV (FWHM)]	
at 5.9 keV	500
at 122 keV	750

### PREAMPLIFIER

- RC Feedback.
- Warmup Sensor/HV Inhibit.

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