Germanium Detector Repair Service

Introduction
ANTECH offers a fast and cost-effective state-of-the-art High Purity Germanium (HPGe) Detector vacuum and electronic repair service at our facility in Denver, Colorado. ANTECH is equipped with multiple turbo-molecular vacuum system pumping stations, a helium leak detection system and detector electronics repair and test capability.

No risk repair
In the unlikely event that a repair is not successful the customer will only be charged the agreed evaluation fee and any applicable handling and shipping costs.

5 - Point Evaluation
ANTECH engineers will cool each HPGe detector to cryogenic temperature using the appropriate liquid nitrogen or electrical cooling protocols and perform a 5-POINT EVALUATION. This evaluation will achieve the following:

1. Physical Integrity Check
   - Diagnose the condition of the HPGe detector
   - Evaluate component degradation
   - Determine the most efficient and most cost effective method for returning the detector to service

2. FET Check

3. Thermal Resistor Check (if applicable)

4. Vacuum Seal Check

5. Detector Resolution Check

PASS
1. Itemise all noted deficiencies
2. Estimate repair cost
3. Notify customer of status
Request approval for repair

FAIL
Notify customer of status and seek further instructions

Repair
Following customer approval, ANTECH will undertake the necessary repairs identified in the 5-POINT EVALUATION. ANTECH technical experts are qualified to perform most aspects of HPGe detector repair, including:

- Conventional pump and bake vacuum repairs
- Electronics repair
- Replace Field Effect Transistors (FET)
- Replace thermal resistor elements
- Adjust, repair and/or replace detector pre-amplifiers
- Replace high voltage filters
- Repair or replace damaged or defective detector output, bias shutdown and high voltage components
Service List

<table>
<thead>
<tr>
<th>Service</th>
<th>Cost (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTECH Five-Point Detector Evaluation</td>
<td></td>
</tr>
<tr>
<td>Replacement HPGe detector shipping container</td>
<td>Cost on Application</td>
</tr>
<tr>
<td>Routine vacuum repair, pump and bake</td>
<td></td>
</tr>
<tr>
<td>Replace FET then routine pump and bake</td>
<td></td>
</tr>
<tr>
<td>Replace Thermal Resistor then routine pump and bake</td>
<td></td>
</tr>
<tr>
<td>Pre-Amplifier adjustment</td>
<td></td>
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<tr>
<td>Pre-Amplifier adjustment then routine pump and bake</td>
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</tr>
<tr>
<td>Pre-Amplifier replacement</td>
<td></td>
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<tr>
<td>Pre-Amplifier replacement then routine pump and bake</td>
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</tbody>
</table>

NOTE: Shipping is charged at cost, or by customer account

Terms & Conditions

HPGe DETECTORS

1. Detectors must be free from contamination and properly packaged for shipment to qualify for repair.

2. In order to establish criteria for effective diagnosis it is useful to benchmark system performance through certified manufacturer records or qualification documentation (current operating specifications are preferable but records of detector performance are also acceptable).

3. ANTECH advises shipping in the original transport box or other suitable shipping container in order to protect the detector from damage. In the event that neither is available, ANTECH can provide an alternative shipping container, for a cost of $250 per detector.

ANTECH REPAIR

4. ANTECH will not perform any repairs, modifications or adjustments without prior customer approval.

5. Repairs other than those stated in the price list will be agreed prior to repair and are priced at hourly rates plus parts.

6. In the unlikely event that ANTECH is unable to repair an HPGe detector (perhaps due to crystal damage, mechanical fault or a customer decision not to authorise the repair) the customer will be charged the evaluation fee and any incurred costs for shipping and handling.

EVALUATION AND REPAIR PERIODS

7. Results of the 5-POINT EVALUATION will be conveyed to the customer within ten business days after the date on which ANTECH receives the HPGe detector.

8. Detector repair will typically be completed within twenty business days after the date on which ANTECH receives repair approval. Conventional pump and bake detector repair will be completed within fifteen business days after repair approval. These lead times may be longer if it is necessary to acquire parts from the original manufacturer.

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