



Part of Synergy Health plc



Sterilisation

Lab Services

Specialist Applications

Contamination Control

[www.isotron.com](http://www.isotron.com)

## Radiation Testing

### Radiation Environments

Ionising radiation is found in a wide range of applications, from nuclear and space, through to numerous industrial processes. Isotron provides a comprehensive selection of radiation testing facilities and services based upon our unrivalled portfolio of irradiation plants across Europe, Africa and Asia.

### Expertise in Radiation Effects

- Pre-irradiation assessments
- Electronic circuit simulation
- Materials selection
- Component selection
- Cobalt-60 gamma irradiation facilities
- Electron beam irradiation facilities (1 – 20 MeV)
- Ion beam irradiation facilities (0.5 – 10 MeV protons, 0.5 – 15 MeV alphas, etc)
- Database of published data on radiation effects
- Shielding/penetration calculations
- Radiation and environmental testing

### Standard Test Routines

A number of standard test routines has been developed for common equipment, materials and components. Examples include:

- Electronic components (Mil-Std-883, ESA SCC-22900)
- CCTV cameras
- Oils and greases (DIN ISO 2137, IP50, IP32, ASTM)
- Proximity detectors (BS5271/EN50.010)

### Our Facilities

The assessment of radiation effects on materials and components normally considers several aspects of the radiation environment in turn. Isotron offers test facilities for total dose, electrons and protons as follows:

- Total integrated dose: gamma radiation from cobalt-60 sources; dose rates from background to several kGy/hr, depending on sample size; in-situ monitoring, temperature control.
- Electron irradiation: from 1 to 20 MeV; doses from tens of Gy to MGy; in-situ monitoring; temperature control; sample handling by conveyor or static positioning under the beam (forced cooling required).
- Proton irradiation: from 0.5 to 10 MeV; irradiation in vacuum or air; in-situ monitoring, temperature control; ISO Class 7 (class 10,000) clean room available.
- Helium ion (alpha) irradiation: from 0.5 to 15 MeV; irradiation in vacuum or air; in-situ monitoring, temperature control; ISO Class 7 (class 10,000) clean room available.

The synergistic effect of irradiation and other factors can lead to more rapid degradation than the sum of the individual effects would indicate. We offer the possibility to irradiate in a range of gaseous environments and vacuum, with heating or cooling, with or without electrical stress and, for solar cells, under illumination. All our irradiation plants also offer dosimetry, which is traceable to national standards.



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## Capability Statement

- **Component testing:**
  - automatic DC and AC characterisation of semiconductor components
- **Computer simulation of electronic circuits:**
  - before, during and after irradiation
- **Component selection:**
  - from our own database of test data
  - on-line access to NASA, JPL, MoD, ESA, etc. data
- **Materials selection:**
  - access to manufacturers' data
  - cross-reference of trade names against polymer types
  - comprehensive database of test data
- **Database of published data on radiation effects:**
  - >2,500 papers
- **Irradiation facilities:**
  - cobalt-60 cells
  - electron beam accelerators
  - ion beam accelerator
  - neutron generator
- **Equipment assessments:**
  - based on collated test data and literature
- **Sub-system testing:**
  - monitoring during irradiation
  - custom-built rigs for transducers, etc.
- **Materials testing including:**
  - lubricants
  - adhesives
  - cable insulation
  - connector materials
  - seals and gaskets
  - paints and coatings
- **Standard test routines:**
  - electronic components (Mil-Std-883, ESA/SCC-22900)
  - CCTV cameras
  - oils and greases (DIN ISO 2137, IP50, IP32, ASTM)
  - polymer and rubber samples (IEC-544, ASTM)
  - fibre optics (EIA-455-49A)
- **Dose rate and lifetime total dose calculations from health physics or other survey data**
- **Shielding calculations:**
  - for new facility design
  - for mission planning
  - for equipment selection

Isotron also offers a range of other species for ion beam irradiation, microbiological testing and sterilisation validation studies for planetary protection. All Isotron facilities are certified to ISO 9001:2000.

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