Product Specifications

The Thermo Scientific D 711 is a high yield generator suited for fixed applications, providing very high overall neutron production with all-digital control, operational flexibility and multiple safety interlocks.

Thermo Scientific D 711 Neutron Generator

High yield neutron generator designed for maximum flux

The Thermo Scientific D 711 is a significant improvement over its predecessor, the A-711, a generator which has 30 years of experience behind it. Due to the excellent experience with all-digital control in other generator models, the D 711 has been designed with an all-digital control system. It also has a significantly improved high-voltage power supply for higher reliability and improved operating economy, improved chillers and an improved neutron tube design. Compared to other commercially available high yield neutron generators, the D 711 is a proven and reliable design that offers advantages in total neutron production, neutron flux, maximum output, lifecycle economics, and easier accelerator head installation into a shield block.

The D 711 consists of four main parts: the accelerator head, a control chassis, cooling units, and the accelerating high voltage power supply. The sealed neutron tube is designed for a maximum yield of $2x10^{10}$ n/s; when running, the coolant units must be operating, cooling both the target and the ion source. The tube has a typical lifetime of 1,000 hours at $1x10^{10}$ n/s; operating it at lower yields will extend the lifetime. For example, running it at $5x10^{9}$ n/s would increase the expected lifetime to 2,000 hours. To maximize tube life, the system manual includes recommendations for setting the high voltage and beam current. The high voltage power supply is designed for quick change-out of the accelerator head, saving time and money.

Applications

- Large object imaging in cargo
- Radiation effects research
- Fast neutron radiography
- Neutron activation analysis

The Thermo Scientific Approach to Digital Control

Choice in Control Interface

- Graphical User Interface
  - Easy, intuitive stand-alone use
- HyperTerminal/Text Command Interface
  - Simple text commands
  - Ideal for integrating the generator into an overall system

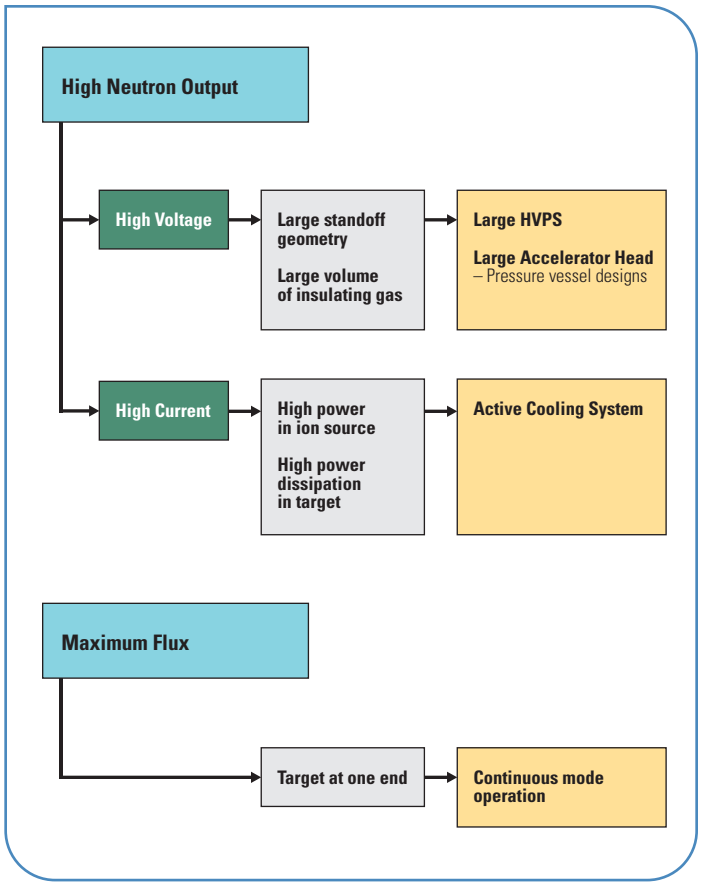
Use a PC to:

- Configure the digital control electronics for operating values of high voltage and beam current
- Turn the neutron production on/off
- Change operating values while running, e.g., accelerating voltage and beam current
- Display real time trends of accelerating voltage, beam current, and reservoir current
- Display status of main interlocks
- Capture generator data logs during operation

Use Digital Control Electronics to:

- Make operation much easier
- Automate startup and shutdown sequences based on direct feedback from the generator and known component limits
- For instantaneous control
- Continuously check operating parameters and interlock status—shut down if any interlock changes state or parameters go out of range.

Background on High Yield Neutron Generation



Thermo Scientific D 711 Neutron Generator

General Specifications	
DT Neutron Yield	$2x10^{10}$ n/s maximum
Neutron Energy	14 MeV or 2.5 MeV
Max Neutron Flux	$1x10^{9}$ n/cm^2/sec @ $2x10^{10}$ n/s output
Typical Tube Lifetime	1,000 hours @ $1x10^{10}$
Operating Mode	Continuous only
Operating Accelerator Voltage	120 to 160 kV
Operating Beam Current	0.5 to 3.0 mA
Control Interfaces	RS-232, RS-422, or RS-485
Total System Weight	1000 kg
Safety Features	Key lock off/on on console and remote EMO box Remote Emergency Off box SmartLamp Normal open and normal closed contacts Pressure safety switches on power supply Pressure safety switch on accelerator head Continuous real-time monitoring Simple GUI interface

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