

Neutron Coincidence Collar (NCC)

N2023-M



Introduction

The ANTECH N2023-M Neutron Coincidence Collar (NCC) is used by safeguards inspectors to verify the fissile material content of fresh nuclear fuel assemblies.

It is a high efficiency neutron detector and is used to verify all types of un-irradiated light-water reactor fuel and fuel assemblies, notably LEU fuel, Mixed Oxide (MOX) fuel, fuels containing burnable poisons such as gadolinium, and other contemporary fuel and fuel assembly types.

It employs the classic “collar” geometry and is designed for non-active and active measurements.

Each unit is supplied with the following components: coincidence collar assembly, cadmium curtains, interrogation source holders, interconnection cables, cart and transportation cases.

Features

- Chamber can be configured for the passive measurement of plutonium content in MOX fuel assemblies and active measurement of Boiling Water Reactor (BWR) fuel assemblies
- 3 detector panels and one moderator panel housing the interrogation source
- 1 set of easily removable cadmium moderator panels, 0.50 mm (0.019in) thickness. They are also available in the following configurations, 0.30 mm (0.011 in), and 0.35 mm (0.013) thicknesses
- Junction box providing a high voltage (HV) connection to ^3He detectors and low voltage (LV) and signal connections to Amptek A111 amplifiers. The door panel has two A111 amplifier units, and each side has one A111 amplifier
- Junction boxes/amplifiers are “daisy chained” together to provide a single signal output to ANTECH Model N2000 Universal Neutron Counter (UNC), ANTECH Model N2000-2 Unattended Monitor or JSR-15.
- 1 TTL output channel (SIGNAL) when used in “OR” counting mode
- Hinged door to facilitate quick loading

Benefits

- 23 highly moderated ^3He neutron detectors to maximise efficiency
- 1 holder is provided for americium/lithium source for active measurements; source holder assembly is easily removable
- Non-interchangeable connector types prevent misconnection
- Instrument can be used with an ANTECH model N2000 UNC, or an ANTECH Model N2000-2 Unattended Monitor or JSR-15 Neutron Coincidence Counter with INCC-32 Software
- Mobile cart provides mounting platform and folds flat for transportation
- Spares and tool kit available

PHYSICAL SPECIFICATIONS		
Outer Dimensions (HxWxD)	510mm x 410mm x 355mm (including connectors)	
BWR fuel assemblies	165mm x 165mm (6.50 inches x 6.50 inches)	
Maximum Weight (excluding trolley)	37.5kg (with 0.5mm cadmium curtains fitted)	
Trolley Weight	15kg	
ELECTRICAL SPECIFICATIONS		
Power to Junction Boxes/Amplifiers	5V DC \pm 10%	
Maximum Power	LV - 5VA	
Maximum High Voltage	HV - 1.8kV	
PERFORMANCE SPECIFICATIONS		
Detection Efficiency	With Cd	17%
	Without Cd	19.5%
Die Away Time	With Cd	40 μ s
	Without Cd	45 μ s
Output Pulse Width	50ns \pm 5ns	
Sensitivity	5x10 ⁴ electrons (nominal)	
Period between consecutive pulses	500ns	
ENVIRONMENTAL SPECIFICATIONS		
Junction Box IP Rating	IP65	
Temperature Range	Operation	5°C - 40°C, 20% to 95% RH
	Storage	0°C - 60°C, 20% to 95% RH
GENERAL		
EMC	Complies with 2004/108/EC	