ORTEC

GRACE

Man-portable system that identifies chemicals in munitions and sealed containers

Man-portable system that identifies the chemical contents of munitions and other unopened containers without opening or sampling them. It uses PINS technology: a neutron generator excites the nuclei in the object and the emitted gamma rays are measured by a mechanically cooled HPGe spectrometer. The system is carried in two carbon-fibre backpacks and controlled from a rugged tablet.



Relative efficiency
>50% typical (ANSI/IEEE 325-1996) [1]

Energy resolution at 122 keV
<1600 eV FWHM (warranted at optimum settings and depending on detector type) [1]

Energy resolution at 1.33 MeV
≤2.5 keV FWHM at 1,332 keV (warranted at optimum settings a nd depending on detector type) [1]

Specifications

DETECTOR

Neutron generator	Mini-Gen (D-D): nominal 6 × 10⁶ n/s, mean neutron energy 2.5 MeV, pulse range 0.5–20 kHz, duty cycle 5–90%; under 75 W typical; 7.3 kg	[1]

PERFORMANCE

Relative efficiency	>50% typical (ANSI/IEEE 325-1996)	[1]
Energy resolution at 122 keV	<1600 eV FWHM (warranted at optimum settings and depending on detector type)	[1]
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COOLING

Cooling	Stirling cooler, approx. 30 W; initial cool-down <10 hours at 25 °C	[1]

SOFTWARE & DATA

Analysis	Automatic chemical analysis every 10 seconds: peak fitting, energy recalibration and decision-tree logic	[1]

POWER & BATTERY

Battery life	Spectrometer: approx. 6 hours at 25 °C with cold detector	[1]
Power supply	Internal swappable Li-ion battery; DC/DC 24 V DC to 16 V DC, 300 W (24 V NATO plug for military vehicles); AC/DC 110/240 V AC to 16 V DC, 300 W	[1]

MECHANICAL

Weight	Backpack 1 (spectrometer, tablet, electronics): approx. 58.5 lb; backpack 2 (stand, neutron generator): approx. 58.5 lb	[1]

ENVIRONMENT & RATINGS

perating temperature	–10 to +40 °C (backpack 1)	[1]

GENERAL

Measurement technique	PINS: neutrons from a D-D neutron generator excite the nuclei and the characteristic gamma rays are measured with an HPGe spectrometer	[1]
Spectrometer	RTEC Trans-SPEC-X-N, mechanically cooled HPGe (Stirling cooler, no liquid n itrogen) with built-in digital MCA, up to 16k channels	[1]
Automatically identified substances	Chemical warfare agents: BR-2, CG, CK, GB, HD, HE, HN, VX, WL; practice fills: bleach, POP, sand, water-antifreeze; smoke chemicals: FM, FS, HC, WP, L	[1]
Control computer	Panasonic Toughbook CF-20 tablet, Windows 10 Pro, 8 GB RAM/256 GB SSD, 10.1 in sunlight-viewable touchscreen, IP65	[1]

Sources

[1] **GRACE Gamma Ray Analysis of Chemical Elements**
RTEC (AMETEK) · product-page · Overview; How It Works; Trans-SPEC-X-N; Specifications – Gamma-Ray HPGe Spectrometer; Specifications – Gamma-Ray HPGe Spectrometer · checked 2026-10-16
https://web.archive.org/web/20261016000000/https://www.ortec-online.com/products/systems/chemical-weapons-id...

Every value is taken from the manufacturer’s own document; the number after the value refers to the source list. Always check against the latest datasheet before ordering.

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