Reuter-Stokes

High performance sensors in depth

Measurement and sensing technology for downhole data you can trust

Custom designed for exceptional downhole sensor performance in extreme environments

Welcome to Reuter-Stokes

Based in Twinsburg, Ohio, Reuter-Stokes offers seven decades of ongoing expertise in the design, manufacture, and installation of its extensive portfolio of gamma, neutron, and orientation technologies. The company's portfolio has evolved across multiple indusries including nuclear instrumentation, radiation monitoring, flame sensing for industrial turbines, and oil & gas.

Why Reuter-Stokes?

Reliability

When you need your downhole sensors to be accurate, trustworthy, and reliable, drilling service and wireline companies around the globe turn to Reuter-Stokes for the sensors that get the job done time and time again.

Investment

Reuter-Stokes continues to invest in new technology to push the industry forward. In parallel, we added **1,600 square feet of dry room production capacity** to deliver quality products on time.

World-class service and support

You want a company that has the technical prowess to understand your measurement needs and how best to accomplish them, coupled with customer service that will make that process as seamless as possible. With over 30 years of experience in rugged downhole sensors for a variety of applications, Reuter-Stokes has the quality and expertise to see your project through to completion.

Overview

- Founded in 1956
- Over 350,000 detectors in service globally
- 70 years of service
- 163,000 square foot facility

Challenges for downhole sensing in depth

High temperatures

Space constraints

Shock

Vibration

Our uniquely rugged design ensures the largest scintillation crystals can be used in operations while keeping sensitive components safe from damage in extreme environments

Custom design **in depth**

Quality, expertise, and performance that will see your project through to completion.

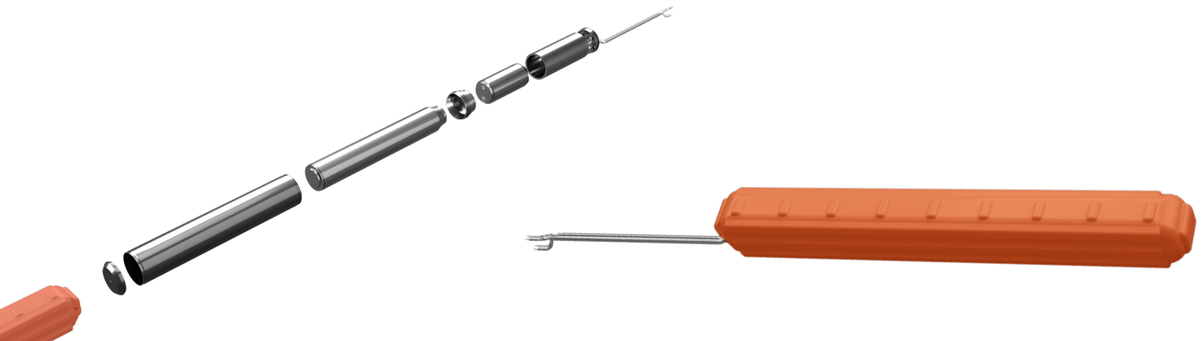
Manufacturing excellence

Our dedicated manufacturing facilities have the advanced technologies, expertise, and rigorously controlled quality needed to deliver precise and reliable downhole sensor units. Our 163,000 square foot facility in Twinsburg, Ohio includes a 1,600 square foot dry room for scintillation crystal processing (right) as well as a 2,800 square foot non-magnetic total field calibration building (bottom right).

A vertically integrated manufacturing process enables complete control over every aspect of detector performance, and we employ many patented technologies to ensure your sensors will survive the most severe downhole conditions.

Custom product opportunity

While Reuter-Stokes has a wide selection of standard products to meet most all downhole applications, most of our gamma sensors and neutron detectors start as custom product offerings. The design of a custom product is a collaborative process with our customers to ensure the final product meets the rigors of a given application. **The result? Improvements you can measure - in efficiency, availability, and performance.**



Proven design expertise

Founded in 1956, Reuter-Stokes has a long heritage of excellence in radiation detection and monitoring. Today, there are more than 350,000 detectors installed in a variety of applications including oil & gas, nuclear power generation, radiation monitoring, and industrial flame sensing.

For example, our neutron detectors were developed with proprietary Helium-3 purification techniques, gas mixtures, and manufacturing process controls to ensure precise matching of operating characteristics among large batches of detectors. This permits parallel operation of multiple units without needing separate power supplies or gain matching.

Core capabilities

- Coil winding for fluxgate manufacturing
- Scintillation crystal machining and polishing
- Low moisture/oxygen glove boxes
- Patented optical coupler technology
- Custom TIG welding equipment
- Brazing furnace for sapphire optical components and ceramics for metal brazing
- Complete radiation test capability

Harsh environment performance **in depth**

We have a wide range of products designed for accuracy, reliability, and durability in the most extreme conditions.

Validated by extreme temperature, vibration, and shock testing, our gamma scintillation packages obtain accurate measurements up to 200°C (392°F). Performance in high shock and vibration environments is ensured with technology such as the flexible dynamic sleeve and our patented spring suspension system, protecting the scintillation crystal from the dynamic environment.

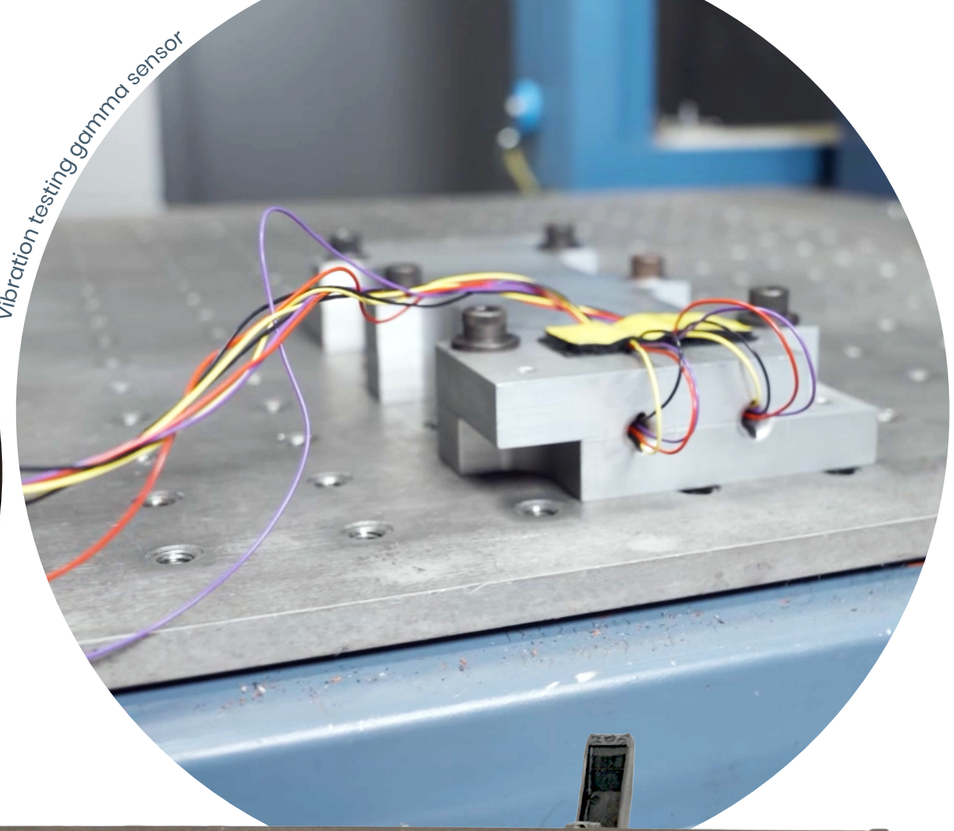
Our Helium-3 filled neutron detectors incorporate the operational experience gained from the design and manufacture of more than 70,000 units over 70 years by Reuter-Stokes. This experience and the associated proprietary processing techniques that have evolved from it, have resulted in detectors that are regarded by many as the industry standard for neutron detection.

Combining robust packaging with high-temperature electronics, our orientation modules are calibrated to deliver accurate survey data over a wide operating temperature range from -20°C (-4°F) to 175°C (347°F), with downhole vibration up to 20 grms.

Quality

We employ extensive testing at every stage of design, qualification, and production - and cover all possible factors affecting durability, accuracy, and reliability. Rigorous calibration processes mean that our sensors meet or exceed our customers' expectations. We fully support all our products with ongoing services in advanced labs, as well as warranties that often exceed industry standards.

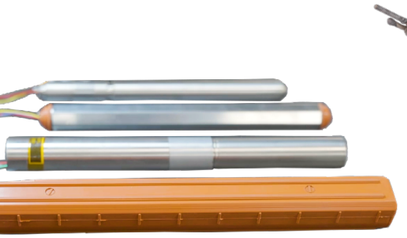
Scintillation crystal polishing in dry room

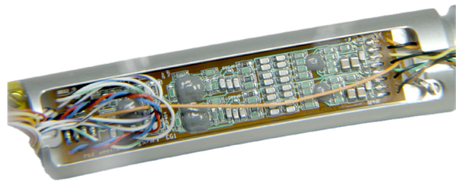


Vibration testing gamma sensor

Non-magnetic calibration lab test equipment

Our products **in depth**





Gamma sensors

Gross counting, spectral, and litho-density gamma detectors, designed to your application. Reuter-Stokes provides a broad range of configurations including crystal size, mounting and interface adaptations, as well as built-in radioactive check sources. All crystal packages are optimized for light output, energy resolution, and sensitivity.

Delivering one of the industry's highest sensitivities, our gamma detectirs provide geologists and drilling contractors with the precise measurements required for accurate formation location and indentification.

Features & benefits

- Operating temperatures: to 200°C (392°F)
- Shock survivability to 1,000 g. 0.5 msec duration
- Random vibration rating: up to 20 grms, 10 to 1,000 Hz

Neutron detectors

Reuter-Stokes has supplied neutron sensors to the oil & gas industry for decades.

With a portfolio of over 10,000+ designs, we can supply a detector to meet your application's specific requirements.

Based on Reuter-Stokes' pioneering Helium-3 proportional tube design, our thermal and epi-thermal detectors are renowned for their consistency and reliability, regardless of pressure, shock, vibration, or temperature conditions.

Features & benefits

- Plateau slope <4% per 100V within the operating voltage
- At least 100 V common plateau between +25°C (77°F) and 200°C (392°F) with <2% count rate shift
- Patented anode suspension minimizes shock-induced false counts

Orientation modules

Reuter-Stokes' custom orientation modules provide unsurpassed measurement accuracy, reliability, and calibration stability - and they've helped our customers achieve drilling records for temperature, depth, and pressure. Our portfolio includes a wide range of sizes, electronics packages, and configurations. Innovative compact electronics and packaging designs result in smaller, more powerful orientation modules designed to fit into the smallest tools.

The technology has undergone extensive testing to ensure the unit's performance is accurate, stable, and reliable.

Features & benefits

- Operating temperature range: from -20°C to 175°C (-4°F to 347°F) and survival temperature range from -40°C to 185°C (-40°F to 365°F)
- State-of-the-art total field calibration lab with best-in-class calbiration services

Specifications/applications **in depth**

Gamma Sensor Specifications

Crystal materials	NaI
Detector size	0.5" to 2" (12.7 mm to 5 0.8 mm) diameter and 0.5" to 12"(12.7 mm to 304.8 mm) length
Pulse height resolution	25°C PHR <9%, 150°C PHR <12.5%, 175°C PHR <15%
Operating temperate range	-32°C to 200°C (-26°F to 392°F)
Shock	Up to 1000g, 0.5 ms duration
Vibration	to 20 grms, 10 to 1000 Hz
Check sources available	Cs-137

Neutron Detector Specifications

Fill pressures	60 to 180 psia (0.4 -1 Mpa)
Detector sizes	Up to 2.25" (57.15mm) outside diameter Up to 12" (304.8mm) length
Operating temperate range	-32°C to 200°C (-26°F to 392°F)
Shock	Up to 250 g, 2 ms duration
Vibration	to 20 grms, 10 to 1000 Hz

Orientation Module Specifications

Inclination accuracy	± 0.10 degrees
Inclination spread	< 0.20 degrees
Azimuth accuracy	± 0.50 degrees
Azimuth spread	< 1.0 degrees
Tool face accuracy	± 1.0 degrees
Total g field accuracy	± 3.0 degrees
Total magnetic accuracy	± 7.0 degrees
Module sizes	1.18 inches (29.97mm) to 1.36 inches (34.54mm) diameter 14.5 inches (368.3mm) to 22.7 (576.6mm) length
Power requirements	± 12.0 to ± 18.0 volts DC
Operating temperature range	0°C to 175°C (32°F to 347°F)
Survival temperature range	-40°C to 185°C (-40°F to 365°F)
Shock	Up to 1,000 g, 0.5 msec duration
Vibration	Up to 20 grms, 5 to 500 Hz

Dig in.

We are a global technology company that designs, develops and manufactures the highest quality, most accurate, and most reliable customized downhole sensors for drilling and wireline applications. We leverage innovation, continuous improvement, and unprecedented quality to enable our customers to successfully operate mission-critical assets in tough downhole environments across the world's most challenging applications.

We provide tailored solutions that address your toughest drilling challenges, embodying our deep domain knowledge of our products with the highest standards of safety, quality, and delivery.

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