DSG
RADIATION-BASED DENSITY MEASUREMENT
WITH GEN2000® ELECTRONICS
Why Use DENSITY MEASUREMENT?

Real Time Process Control: Measurement in real time allows for immediate feedback and continuous process control.

On-line Measurement: Measurement of the product is made in the process pipeline [2”(50mm) to 32”(813mm)] directly; no sampling of the product is required to analyze density, eliminating the need for bypass piping.

Low Maintenance & High Reliability: Being non-invasive to the process and with no moving parts, nuclear density gauges provide reliable long term measurements. No parts that could foul, corrode or wear are intrusive to the process.

Measurement of Difficult & Extreme Process Materials: Non-invasive nature of measurement allows use in process with:
- High Temperature
- High Pressure
- Non-Invasive Requirements
- Corrosive Materials
- Volatile & Biohazardous Materials

True Density Measurement: Density is directly measured as mass in a given volume. Density measurement is not inferred from another process variable prone to change differently from density, such as deflection, viscosity, or refractive properties.

Low Total Installation Cost: No intrusions or additions are required in the pipeline for installation in standard applications.
Principles of OPERATION

Gamma-based density gauges consist of a sealed source in a sourceholder and a scintillation detector. The sourceholder is mounted on the side of a pipe or chute with the detector on the opposite side. A focused beam of gamma radiation is transmitted from the source through the pipe and process material to the detector. As the density of the material in the pipe changes, the amount of radiation reaching the detector changes. The greater the density of the material, the lower the radiation field at the detector; the lower the density of the material, the higher the radiation field at the detector.

When the radiation strikes the scintillation crystal, pulses of light are emitted which are detected by a photomultiplier tube. The photomultiplier tube outputs a signal proportionate to the number of light pulses received. The DSG electronics monitors this signal and generates a scaled 4 to 20 mA or other useable process signal.
## BENEFITS of the DSG

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>PROCESS TEMPERATURE COMPENSATED DENSITY</strong></td>
<td>With input from a temperature probe, the density can be calculated to a reference process temperature.</td>
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<td><strong>EASE OF CALIBRATION</strong></td>
<td>For most applications, users can utilize a one-point calibration method referencing a fluid of known density. The two-point calibration method is also supported.</td>
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<td><strong>PERCENT SOLIDS MEASUREMENT</strong></td>
<td>When the carrier fluid remains stable, nuclear density gauges provide highly accurate measurement of percent solids for most slurries.</td>
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<td><strong>MASS FLOW MEASUREMENT</strong></td>
<td>When used in conjunction with a flow meter, nuclear density gauges provide online mass flow monitoring.</td>
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<td><strong>POINT LEVEL SWITCH</strong></td>
<td>Due to its high sensitivity, the DSG can be used for point level applications. System includes one analog and one discrete output.</td>
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<td><strong>COMPATIBLE WITH MOST SOURCE HOLDERS</strong></td>
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<td><strong>AVAILABLE WITH PVT PLASTIC OR SODIUM IODIDE CRYSTAL</strong></td>
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MOUNTING & Accessories

A  EQUIVALENT ABSORBER
Used to simulate a known process value, the equivalent absorber acts as a reference and is able to be inserted for calibration of the detector. Designed to be mounted on the source side of the system.

B  THERMAL ISOLATION MOUNTING
These heat resistant fiber plates are used to prevent excess heat from reaching the detector. Designed to be mounted on the detector side of the system.

C  DETECTOR SIDE COLLIMATOR
Used to minimize the influence of scattered radiation from the system source. Designed to be mounted on the detector side of the system.

D  30 DEGREE OFFSET BRACKET
Designed to maximize the length of the measurement path for small pipe applications with minimal changes in density.

E  16” TO 36” BRACKET SET
Rounded clamp-on brackets for pipes or applications with an OD of 16 to 36 inches (406 to 914 millimeters).
30 DEGREE ANGLE

PERPENDICULAR MOUNT

LARGE BRACKET
ELECTRONICS
& Configuration

ELECTRONICS
The GEN2000® electronics is a modern generation of compact, lightweight, and modular electronics utilized by many Ohmart/VEGA level and density detectors.

Cast Aluminum Compact Housing
• Lightweight and compact
• Available with PVC coating

Modular Electronics
• Easy maintenance
• Surface mounted component technology for increased reliability

Outputs Include:
• 4 to 20 mA DC with HART® Protocol communications
• Foundation Fieldbus digital protocol
• Frequency output for remote-mounted electronics

Universal Power Input:
• Power supply can be connected to an AC or DC input

Configuration:
• HART® Handheld
• PC Software Ohmview 2000
• DCS Systems

O-ring Seal Design
• To prevent moisture infiltration and allow 360 degrees orientation, the housing incorporates o-ring seals at the threaded connections.
# DSG At a Glance

<table>
<thead>
<tr>
<th>DSG Special Features</th>
<th>Model DSGF Smart Pro®</th>
<th>Model DSGH HART®</th>
<th>Model DSGF Remote HART®</th>
<th>Model DSGD Foundation Fieldbus®</th>
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<tr>
<td>mass flow</td>
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<td>temperature-compensated density</td>
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<td>NORM compensation</td>
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<td>single point calibration</td>
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<td>4 - 20 mA from gauge</td>
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<td>digital output</td>
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<td>integral electronics</td>
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<td>remote electronics</td>
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<td>diagnostics</td>
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<td>relay output</td>
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<td>2 analog outputs</td>
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<td>x-ray safeguard</td>
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<td>point level</td>
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<td>totalized mass output</td>
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Training & SERVICE

Ohmart/VEGA is able to meet all of your radiation service and training needs. With state of the art classroom facilities, service personnel located worldwide, and a full production and service facility, Ohmart/VEGA is always ready to provide the following:

- 24 hr. emergency service phone support
- Radiation survey meter calibration
- Product training and system operation
- Radiation safety school certification
- Wipe test and wipe test analysis
- Service, maintenance, and disposal of source material
- Start up and commissioning
- Electronics training
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Measurement SYSTEMS

In addition to the DSG, Ohmart/VEGA is a world leader in systems including:

**INTERFACE LEVEL**

The SmartScan offers high resolution and an unparalleled method of measuring and tracking interface levels.

**POINT LEVEL**

Point level systems for high and low level alarm.

**CONTINUOUS LEVEL**

Continuous level systems for constant monitoring, available in traditional or flexible scintillators.

**WEIGHING SYSTEMS**

Weigh scales with no moving parts for conveyors, chain drives, or screw systems.

**SOURCE HOLDER MANAGEMENT**

A wide variety of source holders to meet every application and measurement need, including low activity source holders.
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fax: 513.272.0133
web: www.ohmartvega.com
e-mail: info@ohmartvega.com