

HAGR™ Sensor

Providing real-time, high-temperature azimuthal gamma ray measurements while drilling

Applications

- Total gamma ray (GR)
- Up/down azimuthal data
- Quadrant azimuthal data
- Eight sectors of azimuthal data

Features and Benefits

- The HAGR sensor saves the client time and money by providing real-time azimuthal GR measurements while rotating or sliding at temperatures up to 356°F (180°C) and pressures up to 30,000 psi (207 MPa).
- Correction algorithms for mud weight, borehole size, and potassium concentration are routinely applied in the field, which avoids the wait involved in taking the information back to the office and processing it there.
- The modularity of the HAGR sensor enables users to run it on multiple tools—the Weatherford hostile-environment logging system, the MFR™ multi-frequency resistivity sensor, and the Revolution® rotary-steerable system (RSS)—as appropriate for the application.

Tool Description

The Weatherford HAGR sensor uses Geiger-Müller (GM) tubes to obtain real-time, high-temperature azimuthal GR measurements while drilling. The HAGR sensor can be placed at various locations within the bottomhole assembly to accommodate the client's requirements for optimal GR measurement.

The sensor is available in four sizes, each comprising banks of GM tubes:

- The 4 3/4-in. sensor has five banks of two GM tubes.
- The 6 3/4-in. sensor has eight banks of two GM tubes.
- The 8 1/4-in. and 9 1/2-in. sensors each have six banks of three GM tubes.

The azimuthal data can be transmitted as quadrant data in real-time mode, as 8-sector data in recorded mode, or as up/down data.



The Weatherford HAGR sensor obtains real-time azimuthal GR measurements while rotating or sliding in HP/HT wells



HAGR™ Sensor

Specifications

Sensor

| Size | 4-3/4 in. | 6-3/4 in. | 8-1/4 in. | 9-1/2 in. |
|-------------------------------|----------------------------|-----------|-----------|-----------|
| Measurement range (API) | 0 to 500 | | | |
| Accuracy | ± 2 | | | |
| Vertical resolution | 18 in. (457 mm) | | | |
| Statistical repeatability API | ± 5 at 100 ft/hr (30 m/hr) | | | |

Configured in the HEL system. For full specifications, see the HEL MWD System TSS 2966.

| Size | 4-3/4 in. | 6-3/4 in. | 8-1/4 in. | 9-1/2 in. |
|--|---------------------|---------------------|---------------------|---------------------|
| Measurement point from bottom of collar-with bore and annular pressure sensor in collar | 8.69 ft (2.65 m) | 8.43 ft (2.57 m) | 8.39 ft (2.56 m) | 8.36 ft (2.55 m) |
| Measurement point from bottom of collar-without bore and annular pressure sensor in collar | 8.46 ft (2.58 m) | 8.20 ft (2.50 m) | 8.17 ft (2.49 m) | 8.17 ft (2.9 m) |

Configured in the MFR sensor. For full specifications, see the MFR Sensor TSS 2968.

| Size | 4-3/4 in. | 6-3/4 in. | 8-1/4 in. | 9-1/2 in. |
|---|---------------------|---------------------|---------------------|---------------------|
| Measurement point from bottom of collar | 3.85 ft (1.17 m) | 4.82 ft (1.47 m) | 4.85 ft (1.48 m) | 4.85 ft (1.48 m) |

Configured in the Revolution RSS. For full specifications, see the Revolution RSS TSS 11404.

| Size | 4-3/4 in. | 6-3/4 in. | 8-1/4 in. |
|---|----------------------|----------------------|----------------------|
| Measurement point from bottom of collar | 10.33 ft (3.15 m) | 12.30 ft (3.75 m) | 13.77 ft (4.20 m) |

* Revolution is a registered trademark of Weatherford in the US and Canada.

