

Comparison Table: BME680 vs. BME688

| Feature | BME680 | BME688 |
|-----------------------------|--|---|
| Primary Focus | General Air Quality (IAQ) | Specific Gas Detection & AI |
| Gas Sensor Type | MOX (Metal Oxide) | |
| AI Integration | None (Software-based IAQ only) | Integrated AI support (BME AI-Studio) |
| Gas Detection | Broad VOCs (Volatile Organic Compounds) | VOCs + VSCs (Volatile Sulfur Compounds) |
| Gas resistance range | Standard | Extended (for better discrimination) |
| Humidity Stability | Moderate cross-sensitivity (~15-25% error) | High stability (<5% error in high humidity) |
| Software Support | Basic BSEC library | BSEC + BME AI-Studio |
| Replacement Type | N/A | Backward compatible "Drop-in" replacement |

Since the BME688 and BME680 provide gas data as resistance in ohms (Ω), the value decreases as the air becomes more polluted. Here is how to interpret those ohm values for a typical indoor environment:

| Gas Resistance (Ω) | Air Quality | Interpretation |
|-----------------------------|-------------|---|
| > 1,000,000 (1M+) | ◆ Excellent | Very clean air. Typical for outdoors or well-ventilated rooms. |
| 500k - 1,000k | ◆ Very Good | Fresh indoor air. |
| 100k - 500k | ◆ Good | Normal indoor environment. |
| 50k - 100k | ◆ Fair | Noticeable odors or VOCs (e.g., <i>cooking, cleaning products</i>). |
| 10k - 50k | ◆ Poor | Significant pollution. Time to open a window. |
| < 10k | ◆ Very Poor | High concentration of VOCs or gases (e.g., <i>heavy smoke or alcohol</i>). |

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