Pressure and Temperature

Instrumentation for ethanol applications
WIKA Instrument Corporation manufactures products engineered with specific design features and gauge options optimized for utilization in the Ethanol industry. This diagram illustrates how WIKA’s technology can help insure reliability through every stage of the Ethanol production process.

The color coded selection guide provides easy product identification for the most common pressure and temperature measurement requirements in the Ethanol industry. Featured products have been selected for their design, durability and proven performance in Ethanol production.
The WIKA Advantage for the Ethanol Industry

Instruments used by the ethanol industry must be rigorous and sturdy enough to withstand the harsh conditions that occur in the Ethanol production process. Malfunctioning devices may impede the optimal performance of this process. WIKA has extensively researched this issue with our customers, incorporating features into our instrumentation that are specific to the Ethanol industry and that will provide the best solution. Not only will these features ensure optimal performance, they will also increase service life and operational safety.

Adding a liquid-filled case to our mechanical pressure gauge helps protect the instrument from mechanical vibration and pressure pulsation experienced during the process. A flushing port added to the housing of a diaphragm seal (where a cavity exists), allows cleaning fluid or simple water to flush residue out of the pipe in order to prevent damage or clogging to the instrument. Please refer to pages 6 and 7 for additional application support.

Additional propriety features have been engineered into our products specifically to withstand the rigorous conditions found in the Ethanol production process.

**Product Configurations Designed for the Ethanol Industry**

WIKA manufactures three product configurations engineered with specific design features and gauge options for utilization in the Ethanol industry. Many other product configurations and designs are available. Please consult the WIKA Technical Team for more information.

**All-Welded System (AWS) with Flushing Port Assembly - M933.D1**

The AWS (M933.D1) is a tamper-proof all-welded system with a Type 233.34, 4½" process gauge featuring a fiberglass reinforced thermoplastic turret-style case, 316SS wetted parts - mounted on an L990.34 diaphragm seal with a 1" male NPT or other process connection. This Ethanol industry design is similar to the proven and rugged AWS (All-Welded System) that is widely utilized in the oil and gas refinery industries.

The M933.D1 is equipped with a Silicone or Glycerine case and a "system fill" selected by the user according to operating conditions. One distinguishing feature of this assembly is the diaphragm seal design. The L990.34 seal has a small cavity below the diaphragm on the process media side. Media may build-up in this cavity over time, necessitating removal to restore proper instrument performance. The flushing port will help facilitate this cleaning process.

**Ethanol Diaphragm Seal Assembly - 133.54 / L990.36**

The Ethanol Diaphragm Seal Assembly is a Type 133.54 4" gauge mounted on an L990.36 flush diaphragm seal with a 1" male NPT process connection. This System is considered to be the "Standard" Ethanol Seal Assembly. It is equipped with a Silicone or Glycerine case and a "system fill" selected by the user according to operating conditions. This System is a direct replacement to the most commonly found gauge assemblies currently used in Ethanol processing operations.

**Ethanol Direct-Drive Assembly - M932.DD**

The M932.DD is a Type 232.34DD 4½" Direct-Drive process-style gauge featuring a fiberglass reinforced thermoplastic turret-style case - mounted on a L990.36 high pressure flush seal or a L990.1A / L990.B mini seal, with a 1" male NPT or other process connection. All wetted parts are 316SS. The M932.DD is equipped with a "system fill" selected by the user according to operating conditions. The Direct Drive Gauge features resistance to severe shock and vibration and is supplied with an external "zero screw" as standard.

**Mechanical Pressure Measurement**

- **700.04 / 700.00**
  - This piston-styled differential pressure gauge is used in measurement applications requiring high differential/static process pressures. This type gauge is suitable for measuring pressure drops across a variety of devices, including filters, strainers, separators and heat exchangers.
  - Size: 2½", 4½"  
  - Case & Bezel: reinforced plastic or aluminum
  - Sensor Housing: 316 stainless steel or anodized aluminum
  - Wetted Parts: aluminum or 316 stainless steel & ceramic magnet
  - Window: acrylic or shatter-resistant glass
  - Accuracy: ±2% of span (increasing)

- **700.05** offers the addition of a separating diaphragm.

**Differential Gauge Membrane Sensing Element**

- **732.26**
  - Type 732.26 is used in measurement applications requiring low to medium differential and/or static pressure processes. Type 732.26 is suitable for measuring tough process applications and liquid level measurement.
  - Size: 4½", 6"  
  - Case: black powder-coated aluminum
  - Sensor Housing: 316 stainless steel
  - Wetted Parts: 316 stainless steel and PTFE-lined
  - Working Pressure: up to 600 psid
  - Accuracy: ±1% of span

**Stainless Steel Case with Brass Wetted Parts Gauge, Liquid Filled**

- **213.53**
  - Type 213.53 is an ideal choice for OEM and general industrial applications requiring an economical liquid filled pressure gauge. Typical applications include pumps, control systems, hydraulic and pneumatic equipment.
  - Size: 2½", 4"  
  - Case: stainless steel
  - Ring: stainless steel – crimped-on
  - Wetted Parts: copper alloy
  - Window: acrylic
  - Liquid Filling: glycerine
  - Accuracy: ±0.15% of span (2½”); ±0.1% of span (4")

**All Stainless Steel Gauge, Liquid Filled**

- **732.26**
  - Type 732.26 is used in measurement applications requiring low to medium differential and/or static pressure processes. Type 732.26 is suitable for measuring tough process applications and liquid level measurement.
  - Size: 4½", 6"  
  - Case: black powder-coated aluminum
  - Sensor Housing: 316 stainless steel
  - Wetted Parts: 316 stainless steel and PTFE-lined
  - Working Pressure: up to 600 psid
  - Accuracy: ±1% of span

**Process Gauge, Liquid Filled**

- **232.34**
  - WIKA process gauges are specifically designed and engineered to provide reliable service in harsh and rugged environments.
  - Size: 4½", 6"  
  - Case: black fiberglass reinforced thermoplastic
  - Wetted parts: 316 stainless steel
  - Ring: threaded thermoplastic
  - Window: acrylic
  - Liquid Filling: glycerine
  - Accuracy: ±0.5% of span

**UniTrans™ Transmitters**

- **UT-10**
  - The UniTrans™ has a turndown capability of up to 20:1, is tank scalable and includes an integral temperature sensor. The UniTrans™ provides an excellent alternative to expensive smart transmitters when local and remote indication from a transmitter is required.
  - Ranges: 5 psi to 15,000 psi
  - Output: 4-20 mA
  - Accuracy: ±0.15% B.F.S.L. (pre turndown)
Application Support for the Ethanol Production Process

Bimetal Thermometer

Wika's process-grade bimetal thermometers are suitable for nearly every direct-reading thermometer application. Their durable construction and finish ensure reliable readings and long-lasting service. The superior quality of the Wika types 30, 32, 50, and 52 are reflected in the seven-year warranty.

Ranges:
-100°F (-73°C) to 1000°F (538°C)
Accuracy: ± 1.0% full scale value (ASME B40.3)
Thermowells available. Patented “Dampened Movement” available for high vibration applications. Please consult factory for additional information.

Twin-Temp Thermometer

The Twin-Temp thermometer can be an option if both analog and 4-20mA output is required. Wika's unique Twin-Temp thermometer combines the accuracy, reliability and easy-to-read dial of a bimetal thermometer with the precision output and data acquisition capability of a thermocouple or RTD sensor. Every thermowell in your process can have two outputs from one instrument.

Ranges:
-40°F (-40°C) to 550°F (288°C)
Accuracy: ± 1.0% of span for each sensor

Application Support for the Ethanol Production Process

Gauge-stand Connections

The gauge-stand connection should mount upright or, at a minimum, an angle for correct installation. The gauge valve should be fitted into a large pipe connection.

Piping

Install pressure instrumentation on larger piping to maintain open access to the measurement point. The piping should be short and stand upright to prevent residue build-up. The opening of the pipe at “x” (see illustration) should be large enough to allow mash or slurry to remain in a wet condition while flowing through the production process. If a small pipe opening is utilized, the mash or slurry can build-up in the pipe and dry out; this can jeopardize the measuring point resulting in inaccurate measurements.

Flushing Port

A flushing port should be installed in the lower diaphragm seal housing if the piping is smaller than 1”. A ¼” female NPT allows cleaning fluid or simple water to flush the residue out of the access pipe and away from the diaphragm. This process can be performed manually. It is mandatory that the pressure used to clean the access pipe is higher than the pressure in the production pipe. In addition, by closing the valve to the production line, the flushing port can be used to test the functionality of the pressure instrument.

Selecting Criteria Guidelines

Mash Applications, Mechanical Vibration, Pressure Pulsation, and High Temperature Media can affect instrument performance. It is important to utilize configurations that will not only ensure optimal performance, but also increase the instrument’s service life and operational safety.

Pump systems transport materials through the production process. This can cause mechanical vibration and pressure pulsation in the piping system. The resulting internal pressure pulsation and mechanical vibration is dependent on the type of pump system (rotary or piston-style design) and the type of media (mash or clean liquid).

The information in the Wika Applications Solution’s table does not take into account clogged pipes. Please refer to “Application Support” information on page 6.

Wika Application Guideline for Mash Applications / Mechanical Vibration / Pressure Pulsation / High Temperature Media

<table>
<thead>
<tr>
<th>Option/Configuration</th>
<th>Mash Applications</th>
<th>Mechanical Vibration</th>
<th>Pressure Pulsation</th>
<th>High Temperature Media</th>
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Cooling Tower

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<td>Diaphragm Seal with Capillary</td>
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Legend

- Level Measurement
- Line Pressure
- Temperature
- Filtration
- Pumps

= Ethanol process recommendations

= Not Effective
= Marginally Effective
= Highly Effective
For over 60 years, WIKA Instrument Corporation has been advancing the world of pressure and temperature instrumentation. Regarded as the global leader, WIKA has pioneered many diverse products for a broad range of industries, end-users and OEM applications. Our success is reflected in our commitment to Lean methodology, product innovation and customer focus.

By combining world-class LeanSigma® operations, state-of-the-art proprietary technology, agile manufacturing and resident engineering, WIKA delivers made-to-order products with minimal lead times and tremendous flexibility. Additionally, the WIKA TRONIC LINE® has a continuously expanding array of electronic transmitters and transducers to meet the emerging demands of integrated and automated systems.

Talk to us to learn about our Total Performance commitment for your pressure and temperature measurement requirements.

To find your nearest WIKA distributor, visit our website at www.wika.com or call toll-free 1-888-WIKA-USA