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Selecting a Pressure Gauge

When selecting a pressure gauge, it is important to consider the following factors to ensure safety and accuracy:

1. Pressure fluid composition
2. Pressure fluid temperature
3. Ambient conditions
4. Pressure range
5. Conditions affecting wear of the system
6. Method of mounting
7. Required accuracy

1 Pressure fluid composition

Since the sensing element of a pressure gauge may be exposed directly to the measured medium, consider the characteristics of this medium. It may be corrosive, it may solidify at various temperatures, or it may contain solids that will leave deposits inside the sensing element. For pressure fluids that will not solidify under normal conditions or leave deposits, a Bourdon tube gauge is acceptable. Otherwise a Sealgauge® or diaphragm seal should be used. A chemical compatibility chart follows this section to aid in the selection of the proper sensing element material.

2 Pressure fluid temperature

Steam and other hot media may raise the temperature of the gauge components above safe working limits of the sealed joints. In these cases it is recommended that a siphon, cooling tower or diaphragm seal be used in conjunction with the pressure gauge.

3 Ambient conditions

The normal ambient temperature range for WIKA pressure gauges is -40°F to +140°F (-40°C to +60°C) for dry or silicone-filled gauges and -4°F to +140°F (-20°C to +60°C) for glycerine-filled gauges. The error caused by temperature changes is +0.3% or -0.3% per 18°F rise or fall, respectively. The reference temperature is 70°F (20°C). The correction is for the temperature of the gauge, and not the temperature of the measured medium. Remote gauge mounting using a diaphragm seal and capillary line is one alternative for applications involving extreme ambient temperature.

Moisture and weather effects must also be considered. Liquid-filled gauges prevent condensation build up. For outdoor use, stainless steel, brass, or plastic cased gauges are recommended.

4 **Pressure range**

A gauge range of twice the working pressure is generally selected. The working pressure in all cases should be limited to 75% of the gauge range. Where alternating pressure and pulsation are encountered, working pressure should be limited to 2/3 of the gauge range.

5 **Conditions affecting wear of the system**

In applications involving severe pressure fluctuation or pulsation, the use of restrictors and/or snubbers is recommended. In addition, liquid-filled gauges increase the service life of gauges in these conditions. WIKA liquid-filled gauges are generally filled with glycerine. Silicone for larger temperature extremes and Halocarbon® for use with oxidizing agents such as chlorine, oxygen, and hydrogen peroxide are also available.

6 **Method of mounting**

Radial (LM) and back (CBM or LBM) connections are available for most WIKA gauges. WIKA stocks gauges with standard NPT threaded connections. Other types such as metric threads, straight threads, hose barbs, and special fittings are available as a special order.

Pressure gauges should be mounted in the upright position. For applications where the gauge is mounted sideways, horizontally, or upside down, contact WIKA Customer Service for gauge type compatibility.

7 **Required accuracy**

WIKA stocks gauges with accuracies from ± 3/2/3% to ±0.1% of span (*ASME Grade B to Grade 4A*).

To ensure safe and accurate gauge selection, you must take all of the above factors into consideration. When in doubt, please do not hesitate to contact your local stocking distributor or WIKA Customer Service for assistance!

1-888-WIKA-USA

Chemical Compatibility Table

Acetic Acid	B	Ethyl Acetate	A	Oxygen	A
Acetic Anhydride	D	Ethyl Cellulose	B	Paraffin	A
Acetone	B	Ethylene	A	Phosphoric Acid	B
Acetylene	B	Ethylene Dibromide	B	Photographic Solutions	B
Alcohol	A	Ethylene Dichloride	D	Pickling Solutions	B
Alums	B	Ethylene Glycol	A	Picric Acid	B
Aluminum Sulfate	B	Ferric Nitrate	B	Picric Acid (dry)	B
Ammonia	B	Ferric Sulfate	B	Potassium Chloride	D
Ammonium Carbonate	B	Formaldehyde	B	Potassium Cyanide	B
Ammonium Hydroxide	D	Freon	A	Potassium Permanganate	B
Ammonium Phosphate	D	Gallic Acid	B	Prestone	A
Beer	A	Gas (for lighting)	A	Salicylic Acid	A
Benzine	A	Gasoline	A	Sea Water	C
Benzol	A	Gasoline (refined)	B	Silver Nitrate	B
Benzyl Alcohol	B	Glucose	C	Sodium Carbonate	D
Bleach Liquors	B	Glycerine	A	Sodium Cyanide	D
Bordeaux Mixture	A	Hydrocyanic Acid	B	Sodium Hydroxide	D
Butane	B	Hydrogen	B	Sodium Nitrate	B
Butanol	A	Hydrogen Peroxide	B	Sodium Peroxide	B
Butyric Acid	B	Kerosene	A	Sodium Phosphate	B
Calcium Bisulfite	B	Lacquers	A	Sodium Sulfate	B
Calcium Chloride	C	Lactic Acid	B	Sodium Sulfide	D
Calcium Hydroxide	B	Lysol	B	Sodium Sulfite	B
Carbon Dioxide(dry)	B	Magnesium Hydroxide	C	Sulfur Dioxide	D
Carbon Bisulfide	B	Magnesium Sulfate	B	Sulfur Dioxide (dry)	B
Casein	B	Mercury	B	Sulfuric (75%)	B
Chloroform	B	Methyl Chloride	D	Sulfurous Acid	B
Chromic Acid	B	Methyl Salicylate	D	Tanning Liquors	D
Citric Acid	B	Naphtha	A	Toluene	A
Coal Gas	A	Nickel Acetate	B	Vegetable Oils	B
Copper Sulfate	B	Nitric Acid (pure)	B	Vinegar	B
Cottonseed Oil	B	Nitrous Acid	D	Water	A
Creosote (crude)	B	Nitrous Oxide	D	Whiskey	B
Dextrine	A	Oil (lubricating)	A	Wines	B
Ethers	D	Oil (refined)	A	Zinc Sulfate	B

NOTE: For steam service, a siphon is required.

Find the process fluid in the table above and match the letter code (A,B,C, or D) with the wetted part material listed below:

A = Brass (Copper Alloy)
B = 316 Stainless Steel
C = Monel®
D = Consult Factory

Advantages of Liquid-Filled Gauges

Liquid-filled gauges
Liquid-filled pressure gauges provide a number of advantages:

* the liquid absorbs vibration and pressure spikes
* the dampening action of the liquid enables the operator to take readings during conditions of rapid dynamic loading and vibration
* the liquid lubricates all moving elements, dramatically reducing wear in the movement
* because most liquid-filled gauges are filled with non-aqueous liquid and hermetically sealed, they perform in corrosive environments and are immune to moisture penetration and icing, and shock effects are lessened

Liquid-filled gauges enhance the reliability and integrity of the measuring system for long periods under extreme operating conditions.

Indicates liquid-fillable pressure gauge.

Liquid Fill Fluid
Ambient Temperature Ratings (Table A)

Allowable Operating Range - Temperature range in which the operation of the gauge is not adversely affected by the filling liquid. At temperatures above the maximum rating, the fluid may break down. At temperatures below the minimum rating, the fluid may solidify (freeze).

NOTE: Some parts of the pressure gauge may not be able to withstand temperatures above 140°F. Consult with the factory for technical assistance for these applications.

Choose the Right Liquid
The type of liquid used to fill the gauge varies with the application. Although pure glycerine provides the best performance in most applications, each has its own requirements. Guidelines to help ensure that a fluid is properly matched to an application are:

* if icing is a problem, use gauges filled with silicone oil or other comparable liquids. They have low viscosities even at -60°C
* if the system has electric accessories, such as contacts, use insulating oils, and
* if extreme temperature fluctuations are expected, use silicone oils

The higher the liquid viscosity, the greater its dampening capacity. The reason for this is that dampening changes in proportion to the temperature-dependent viscosity of the filling liquid. The suitable degree of dampening depends on the operating requirements the gauge must meet, such as pointer response time, pressure extremes, vibration, and changes in pressure. WIKA can recommend specific liquids to suit problem applications.

Fill Fluid	Allowable Operating Range
Glycerine Dow 99.7% USP, Synthetic 1118 Centistokes at 68°F	-4°F to 140°F -20°C to 60°C
Silicone Dow Corning 200 Fluid 1000 Centistokes at 77°F	-40°F to 140°F -40°C to 60°C
Halocarbon® Halocarbon® Products 6.3 Centistokes at 100°F	-40°F to 140°F -40°C to 60°C

Table A - Allowable Ambient Temperature Ratings

Liquid-Filled Gauge Case Venting

For pressure gauges with full scale ranges of 300 PSI and below (including vacuum and compound ranges of 30" Hg-0-200 PSI and below), case venting (after the gauge is installed) is necessary to preserve the accuracy. Temperature fluctuations during shipment and in the process application cause the liquid filling to expand and contract which in turn increases or decreases case pressure. As a result, accuracy can be decreased and the pointer may not return to zero properly until the gauge is vented to the atmosphere.

To vent a WIKA gauge, move the valve to the open position which will release any pressure or vacuum built up in the case. If the gauge is installed in an upright position, the lever can be left in the open position. The lever allows the use of a gauge in a non-upright orientation.

Vent Plug

WIKA Type Numbers

The following is a guide to the WIKA model numbering system.

2 1 3 . 4 0 _ _

WETTED PARTS
(Parts in contact with the fluid)

0 = Special design
1 = Copper alloy (brass)
2 = Steel
3 = Stainless steel
4 = Nickel - iron alloy (Ni-Span C®)
5 = Plastic (Refers to coating or lining, not actual sensing element)
6 = Nickel - copper alloy (Monel®)

BASIC INSTRUMENT TYPE (Instrument Series)

1 = Standard General Purpose Design
2 = High Quality Industrial Design
3 = Test & Precision Test Gauges
4 = Sealgauge® Diaphragm Gauges
5 = Absolute Pressure Gauges
6 = Capsule Pressure Gauges (Low pressure)
7 = Differential Pressure and Duplex Gauges
8 = TRONIC Line
9 = Diaphragm Seals

CASE FILLING

0 = Special type
1 = Standard type
2 = Increased water protection (splash resistant) - dry case
3 = With liquid filled case or ready-to-be filled
4 = Square or rectangular housing

DESIGN FEATURES

10 = Standard design - (lower mount connection in "100 series")
11 = Compressed gas gauges or small size stainless steel
12 = Standard design - (center back mount connection in "100 series")
13 = Liquid-filled ABS plastic case
15 = Special stainless steel gauge

20 = Heavy duty case, usually with bayonet ring, separate lens and increased dust and water spray protection
25 = Hinged ring design

30 = Solid-front, blow-out back case (safety case).
34 = Fiberglass reinforced thermoplastic case - "Process Gauge"

40 = Forged brass case.
41 = Special design for mining industry

50 = All stainless construction
52 = Gas density monitor or controller
53 = Stainless case, o-ring or welded connection to socket, crimped ring bezel
54 = Stainless case, o-ring or welded connection to socket, bayonet ring

SPECIAL FEATURES

Some products may have additional letters in the type code. This typically indicates a special feature or application

Ordering Guidelines
for Pressure Gauges

1) "Quick Order" 7- or 8-Digit Part Numbers:

Example: 9834850

Use the part number for the instrument you wish to order. Please note: **"BOLD & BLUE"** highlighted numbers in the 2007 Ordering Catalog represent "Stock" products, most of which ship in 24 hours (subject to prior sale and availability). Part numbers exist for most high running items and standard product configurations.

If you need additional options, or don't see a part number referenced for the exact product you need, you may use "DESCRIPTIVE TEXT" as indicated below (see #2). **A 7-or 8-digit part number will be provided with your Order Confirmation.** The part number provided may then be used for re-ordering purposes.

2) Descriptive Text Part Number System:

Example:

Standard Product Description Section					Additional Options & Accessories
232.34	**4.5**	**100PSI**	**½"**	**LM**	**SG, R**
(Typel #)	(Dial Size)	(Pressure Range)	(Process Conn. &	Location)	(Additional Options / Accessories)

The above example would indicate a 4 ½" process gauge, dry, 100 psi dial scale, ½" NPT connection, lower mount connection with the following selected options: safety glass (SG) and restrictor (R), as indicated.

- Descriptive text can be used anytime you do not find an exact item with a listed part number. You may add as many codes at the end of the descriptive text as is required to configure the product.
- CODES and installed prices are found on a selection chart for each Model Type. Additional options may be located on the Accessory pages section in the back of the Ordering Catalog (pages 456 - 476).
- Please reference the WIKA Type Number (pg. 7) for additional Model/Type information. WIKA Model Types may already determine many configurations for wetted parts and case fill.
- Options and Accessories should always appear at the end of the Descriptive Text, separated by commas. If you are not sure what to use for abbreviated code, then simply SPELL IT OUT.

NOTE: If you provide a part number and descriptive text, we will use the part number only.

If you are unclear, do not see the option(s) needed, or require ordering assistance, please contact a WIKA Customer Care or Technical Quote Team Representative.