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Pressure Gauges:

Your Window into the

Steam Process

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"Small enough to care,
large enough to cope."

IMPORTANT

INCORRECT SELECTION, INSTALLATION OR USE MAY CAUSE EXPLOSION LEADING TO DAMAGE AND INJURIES

The following information should be read carefully BEFORE selection, installation or use of a pressure or vacuum gauge

When selecting a pressure or vacuum gauge for the application, the following points must be taken into consideration and must be acted upon where appropriate to remain in accordance with BS EN 837-2: 1998 and for the general safety of users and the protection of plant and equipment.

Selecting the correct pressure gauge

1) **Working Pressure** - On a static load, a gauge should not be continuously used above 75% of its maximum scale graduation. On cyclic pressures a gauge should not be continuously used above 65% FSD.

2) **Pulsating Pressure** - Fluctuating, pressure shocks and high frequency pressure oscillation will all severely reduce the normal life of a pressure gauge. These are best avoided but if not possible suitable protection devices such as restrictor screws or snubbers are available.

3) **Maximum Pressure** - Gauges should never be pressured beyond the maximum scale graduation as this may cause gauge failure. If over-pressure capability is required, please contact the manufacturer as on certain models gauges can be built to withstand over-pressure. Alternatively a pressure relief valve should be installed.

4) **Pressure Medium** - The pressure medium entering the gauge must not be corrosive or damage the internal wetted materials.

5) **Hazardous Medium** - Extreme caution should be taken when selecting, installing and using a gauge on explosive, flammable, toxic or oxidizing materials. These should only be purchased and installed by a competent and qualified instrument engineer.

6) **Medium Temperature** - This must not exceed the safe operating limits of the gauge. As a guide the medium temperature should not exceed 65°C but this should always be checked with the
manufacturer. Should the medium temperature exceed 65°C a syphon should be fitted to reduce the medium temperature or a different construction gauge must be considered.

7) **Gases & Steam** - Special safety aspect gauges should always be used. These are Classified Si (blowout device fitted), S2 (safety pattern type) or S3 (safety pattern type with solid baffle wall). Only on gauge diameters less than 100mm and pressures less than 25 bar is a safety aspect gauge not required.
Steam must not enter the gauge directly due to its high temperature (see Medium Temperature in paragraph above).

8) **Oxygen & Acetylene** - Special oxygen use or acetylene use safety gauges must be used. For oxygen these must be either S2 or S3 safety type (depending on diameter) and all parts must be totally oil free. The dial must be clearly marked "Oxygen" and "Use No Oil" or the crossed out oilcan symbol.

9) **Glycerine Filled Gauges** - Never use with strong oxidising agents such as (but not limited to) Oxygen, Chlorine, Nitric Acid and Hydrogen Peroxide.

See overleaf for installation and maintenance recommendations.

Installing pressure gauges correctly

1) **Tools** - Always use the correct size spanner on the gauge square or hexagonal block, never
tighten gauge up using the case. .

2) **Joints** - All pressure connections must be leak tight and when pressure first applied should be checked. Gauges with parallel threads should be fitted using a suitable washer and fully seated onto the fitting face. Gauges with tapered threads must be sealed using suitable jointing materials.

3) **Isolation** - It is highly recommended that an isolating valve or gauge cock should always be fitted between the "line" and pressure gauge to enable" gauge removal without "line" interruption. Always open any valve or gauge cock slowly to avoid pressure shock to gauge.

4) **Vibration** - This can severely reduce the normal life of the gauge. Use a glycerine or other liquid filled gauge and ideally mount gauge away from vibration source and connect with flexible pipe/hose.

5) **Ambient Temperature** - Gauge accuracy and safety can be affected. Always try and isolate gauge from heat. As a guide, if the gauge is too hot to touch it is exceeding its design limits. Any process fluid must never be allowed to freeze within the gauge as this will damage the gauge.

6) **Surface Mounting Gauges** - Should be connected with flexible hose/pipe to avoid transmitting vibrations and to allow medium expansion or contraction due to temperature fluctuations. When tightening the connection an opposing spanner must be used on the gauge square or hexagonal block. Any gauge with a safety blow-out device/bung at the back should always be mounted at least 20mm from the mounting surface.

7) **Flush/Panel Mounting Gauges** - Should be connected with flexible hose/pipe to avoid transmitting vibrations and to allow medium expansion or contraction due to temperature fluctuations.
When tightening the connection an opposing spanner must be used on the gauge square or hexagonal block.

8) **Gauge Orientation** - Gauge must always be installed vertically unless specially manufactured and calibrated for angled use.

9) **Glycerine Bung** - Atmospheric temperature changes may cause pressure to build up within the gauge resulting in pointers lifting off zero and/or reading or calibration inaccuracy. This typically happens with vacuum or lower pressure ranges. Should this be the case then the glycerine bung should be cut or pierced according to the label.

10) **Liquid Lines** - Any static head of liquid must be compensated for during gauge selection and calibration. Lines should always be completely full of liquid and care should be taken to avoid loops where air or vapour can accumulate or cause air locks.

11) **Air/Gas Lines** - Pipe work should always rise continuously to the gauge to allow any condensing moisture to drain away from gauge.

Maintenance of pressure gauges

1) All gauges should be regularly visually checked and if indications appear to be abnormal removed for inspection immediately. Ideally a spare identical gauge should be fitted to ensure the line pressure can continue to be monitored. **This work must be undertaken by qualified personnel.**

2) Removed gauge should be tested by the manufacturer or qualified personnel and re-calibrated or replaced if faulty.

3) Periodically testing of gauge accuracy and operation should be carried out by qualified personnel using suitable testing equipment.

Typical Application	Pressure Range	Pressure Gauge Selection
Downstream of a control valve at the inlet to a Plate Heat Exchanger	0-3 Bar	-1 to 4 Bar G
Downstream of a control valve at the inlet to a shell and tube heat exchanger	0-5 Bar	-1 to 10 Bar G
Downstream of a Pressure Reducing Valve	0-7 Bar	0 to 10 Bar G
On 7-10 Bar steam main	7-10 Bar	0 to 16 Bar G
Medium Pressure steam supply	10-15 Bar	0 to 25 Bar G
High Pressure Steam Supply	15-25 Bar	0 to 40 Bar G

PLEASE NOTE:

Always mount pressure gauges with a ring syphon & cock or U Syphon & Cock to protect the gauge from high temperatures.

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