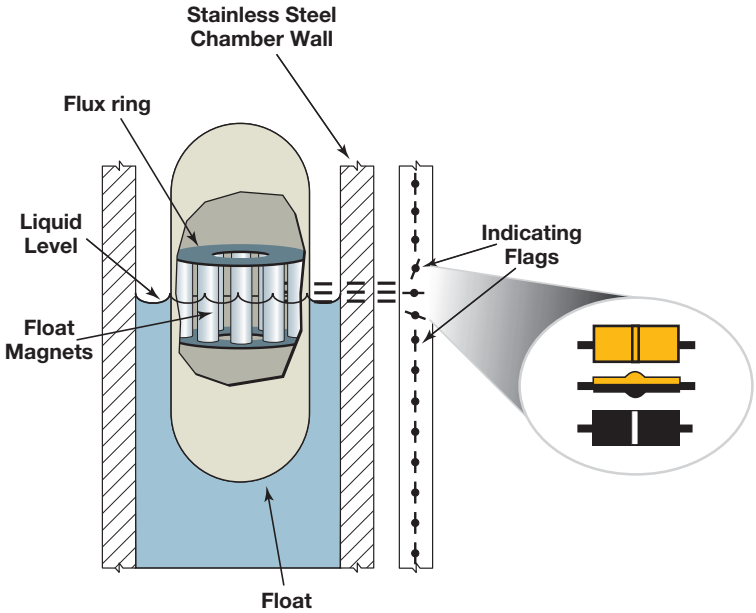
The Evolution of Magnetic Level Indicators – *the next step*

Many companies in process industries desire the ability to view the level of liquid in various stages of the process. Traditionally, armored glass sight gages have been used, but many companies are moving away from using them; often from a safety standpoint. They realize the potential for leaks of hazardous materials and even breakage or bursting, particularly with hazardous chemicals or high pressure. In addition, the requirement to retransmit or remotely monitor the level, is difficult with a sight glass. The solution is simple: Use a magnetic level indicator (MLI).

Magnetic Level Indicators

Very briefly, magnetic level indicators utilize the magnetic coupling principle to provide level indication, switch action or continuous level output. The drawing below shows a cross section of the unit.

The float moves up and down tracking the surface of the liquid. The float's integral magnets provide a magnetic field which is transmitted through the chamber wall to the indicator flags. Each flag contains a magnet of its own which reacts with the float magnet to flip the flag when the float passes, revealing a contrasting color. Externally mounted switches can provide alarm indication by also reacting to the float magnet's field. Other measurement options are resistive reed chain, or magnetostrictive transmitters which provide continuous level monitoring by reading the float's position via the magnetic field.



Safety

The most obvious benefit is the safety of magnetic level indicators simply due to the use of a metallic instead of a glass pressure boundary. Essentially, the magnetic liquid level indicators are as safe as any other piping connected to the vessel. Since the indicators, switches, and transmitters are externally mounted, they are unaffected by the pressure inside the chamber.

Maintenance

Outside of safety, several other advantages exist to using magnetic level indicators instead of glass gages. One of these advantages is that periodic maintenance is required with glass sight gages to check for leaks and clean the gages. Scale and product build-up can cause them to become unreadable. The magnetic level indicators never touch the process, therefore the unit is virtually maintenance free once installed. Significant cost savings can be realized through the use of MLI's.

Visibility

Visibility is another major factor since long-distance viewing of a glass gage provides no indication of level whatsoever. For the magnetic liquid level indicators, the bright orange flags contrast with the black backside to provide liquid level indication that is visible at over 100 feet.

Installation

In many cases the longest single length of a glass gage is approximately 12 inches. Therefore even a short measurement range of 30 inches requires three glass gages. In addition to the gages, at least six isolation valves are required and multiple pipe fittings and threaded joints making installation more time consuming, cumbersome, and expensive. A single MLI replaces it all.

Flexibility

The glass level gage provides one type of measurement capability — visual level indication. Magnetic level indicators provide improved visual indication and also provide the opportunity to add alarms or transmitters at any time, as they are external.

The Next Step, what to look for

With the increased safety and flexibility MLI's offer, you can see why they have become popular. Their simple design has resulted in many companies manufacturing them. But like any popular product, evolution brings improvements that put some ahead of others.

The main bridle is basically just a piece of pipe but make sure it's built and certified to the ASME B31 standard and comes with a Canadian Registration number (CRN) for the province you are in. After that, you need to look at the magnet and the field it creates, as a concentrated, high gauss field is critical to reliable operation. We recommend you go beyond a single magnet, or series of magnets around the perimeter and get a unit that focuses the field strength where you need it, with the addition of a magnetic flux ring, that also adds rigidity and strength to the design.

Next, evaluate the indicator assembly. We suggest you avoid plastic and go with long lasting metal flags that don't warp or stick. These flags should be enclosed in a metal frame. We suggest you avoid long plastic or glass enclosing tubes that can twist out of alignment or break. Shuttle indicators may be used to save cost, but are not recommended in flashing applications. You may have seen the "checkerboard effect" you can get with some flags flipped and others not, making it difficult to determine the real level.

On a quality gauge you will find these flags enclosures filled with a dry inert gas and hermetically sealed, preferably with a valve to ensure the seal integrity

Finally, consider selecting the right transmitter for the application to remotely monitor the level. Choices include inexpensive reed chain transmitters (limited resolution) or high accuracy magnetostrictive transmitters. Both types pick up the magnetic field coming from the float. However be wary of putting all your eggs in one basket. The float is a moving part that could stick or be damaged, if so, you would lose your local indication, alarms and retransmission. Fortunately there is a way to overcome this with a new transmitter option that is indep ent of the float. A metal rod is added into the main vertical pipe or bridle of the MLI, that acts as a waveguide for a compact loop powered radar transmitter. This allows the level in the bridle or chamber to be independently tracked. The float continues to operate the flags and alarms. But the transmitted 4-20 mA signal continues to function even if the float sticks. True redundant reliability is here at last!