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"Why Our Float Magnetic Field is Superior"

May 6, 2004

A look Inside the Jerguson Float

The factory preaches, “Jerguson has the strongest magnetic circuit on the market”…but why? The common answer is that “Jerguson uses two continuous ring magnets with opposing north fields. By doing this, they create a very strong north field to activate the flags, switches and other devices.” This is all true, but did you ever wonder why simply pushing the two north fields together made the Jerguson design superior to all other Magnetic Gage manufacturers?

In order to explore the physics and engineering behind this design, we need to take a look at basic magnetism. If we look at a standard bar magnet, there are two poles, a north and south at either end. (The north will read positive on a gauss meter and the south will read negative.) In order to map a magnetic field, we look at magnetic flux lines. Magnetic flux lines are a graphical representation of the magnetic field density. They show the direction of flow for the magnetic field and represent relative field strength - the closer together they are, the stronger the field. Flux lines will always travel from the north pole to the nearest south pole and always leave and enter surfaces at 90°, or perpendicular to the surface. They can only travel in straight lines or curved paths, which means they can never make a sudden abrupt change in direction. Flux lines will also always follow a path of least magnetic resistance. Most importantly, they can **never** cross one another. It is this final premise that helps explain the physics behind the Jerguson magnet arrangement.

If we look at the two continuous ring magnets while they are far apart, the magnetic flux lines will travel from the north to south pole as defined above. As we start to bring the two north poles together, remembering that flux lines cannot cross, the flux lines at the north poles will start to bend or deflect away from one another. This is why the two magnets want to push apart. (Remember Newton’s third law; For every action there is an equal and opposite reaction.) As we continue to push the magnets together to the prescribed standard spacing, the magnetic flux lines continue to bend, thereby projecting the magnetic field further away from the OD of the magnets – easily encompassing the mounting locations of our flag indicators, switches and transmitters. All of these devices are magnetically actuated, the stronger the magnetic field present, the more reliable these devices will function.

Figure 1 below illustrates the magnetic flux plot of the Jerguson magnet arrangement. (Note that this is a cross section of half the arrangement.) Look at the field lines as they leave the two north poles as opposed to those that leave the south poles. Notice how these lines are forced to deflect as described above. Also notice how close together the lines are around the north poles. This serves as an indication of field strength, which is plotted in Figure 2. Notice in Figure 2 the size and strength of the north field compared to the south.

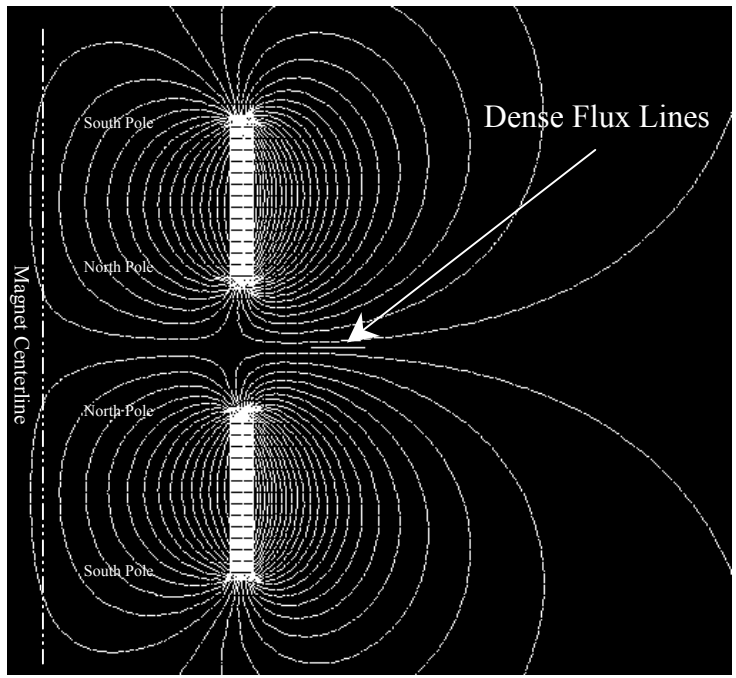

Figure 1

If the Jerguson arrangement consisted of only one magnet, as do some of the competitor's, then the strength of the north field would be identical to, and as weak as, the south field shown below. It is apparent that at the location of the indicators, switched and transmitters, the field would not be as intense. While competitors who use a single annular ring magnet have a design inferior to Jerguson's, there are other competitors whose design is poorer yet. Some manufacturers use a series of single bar magnets in a circular array in their float design. The relative field strength of the north and south poles will be equal to one another and less than that of the Jerguson south pole. Moreover, the field strength as you travel around the circumference will have high and low spots as you pass between the individual bar magnets.

The magnetic circuit is the heart of the magnetic level gage – the stronger the circuit the better the device. There is a plethora of magnetic gage manufacturers on the market today. As verified by independent experts in magnetic technology, Jerguson has the strongest magnetic field on the market – and the design is patented.

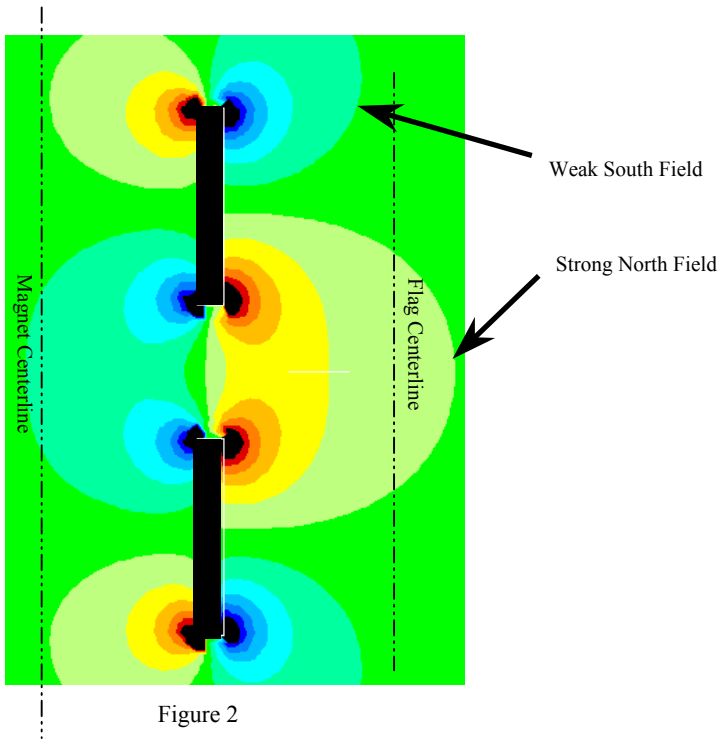

Figure 2

Magnicator® II Float

K-Tek Float

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