

Thank You for Attending Our December Webinar:

Innovations in Magnetic Level Indication



Your Host

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Featured Speaker

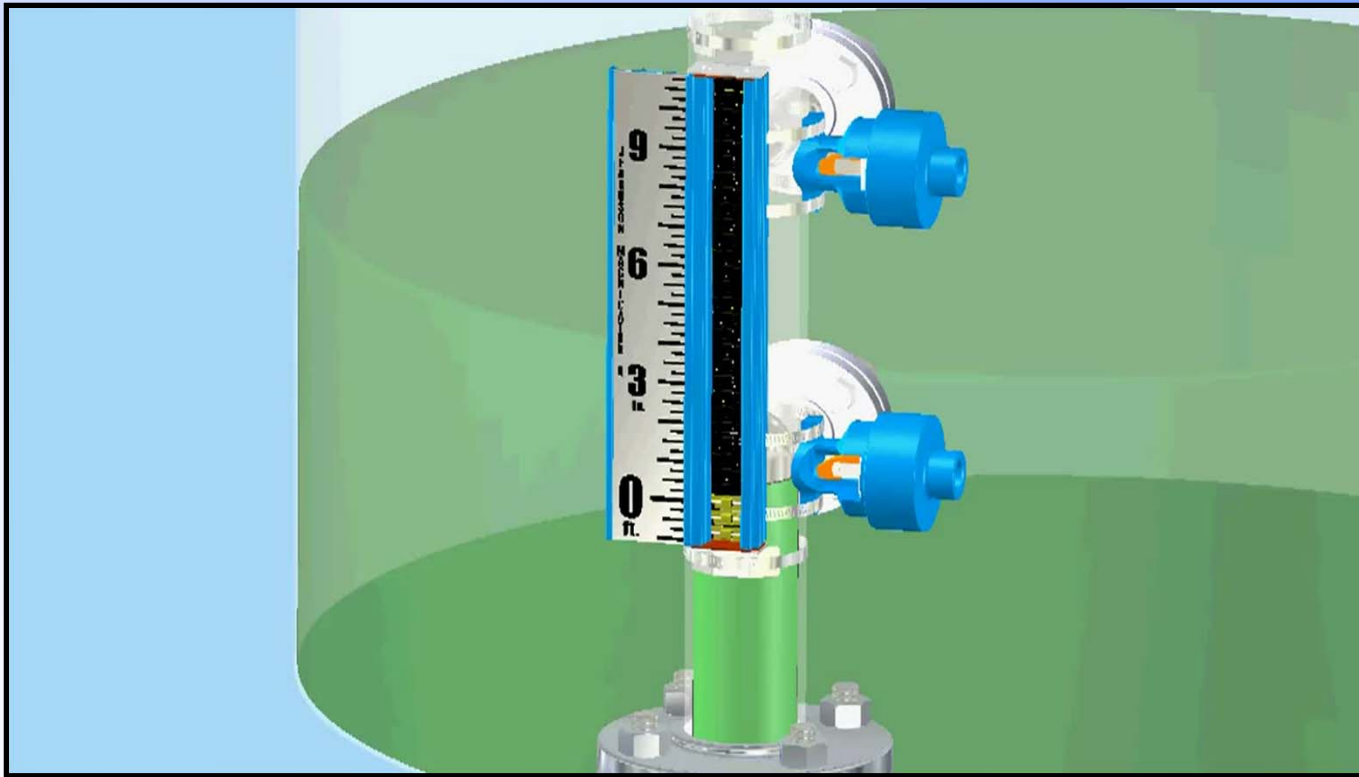
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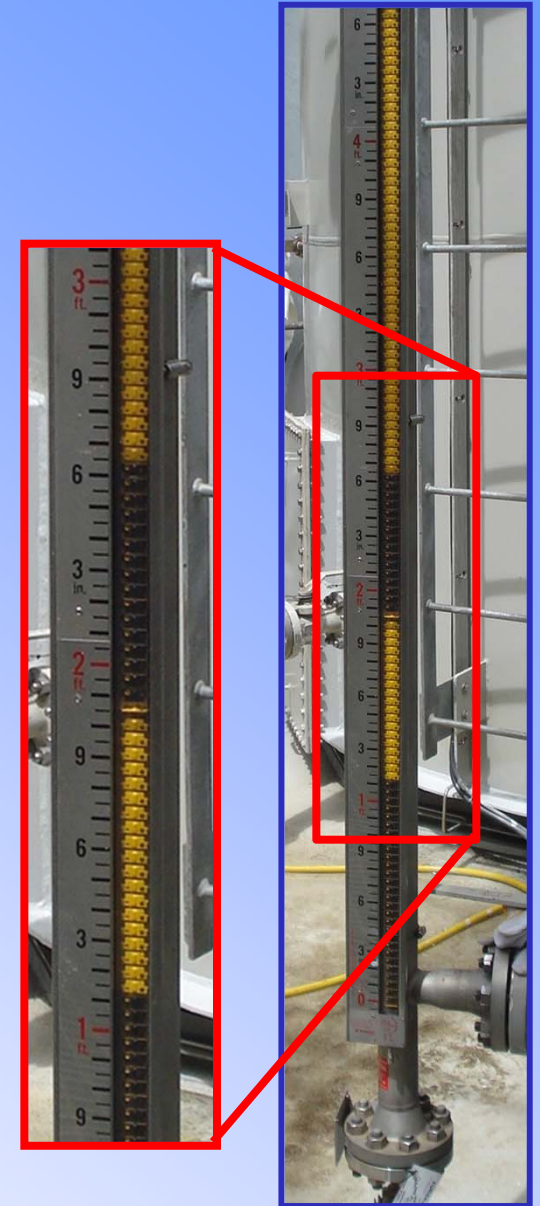
Magnicator

Magnetic Liquid Level Gages



Reliability Issues

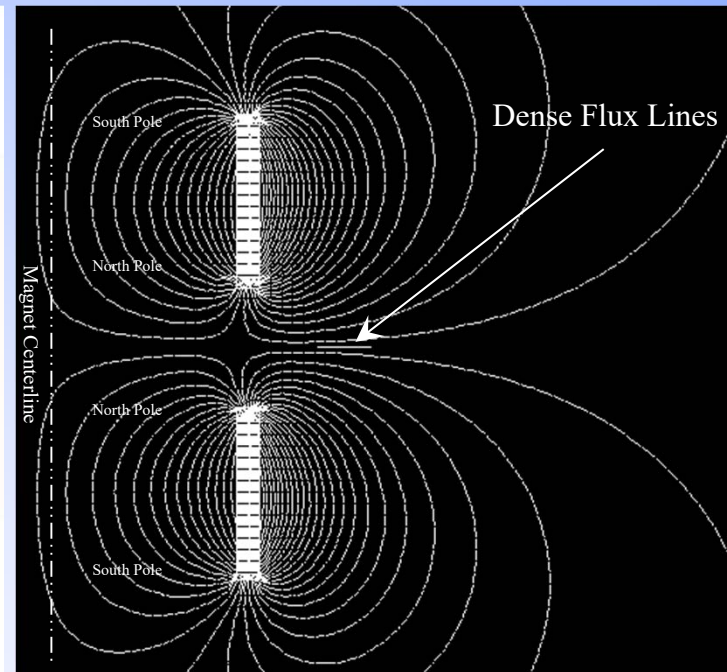
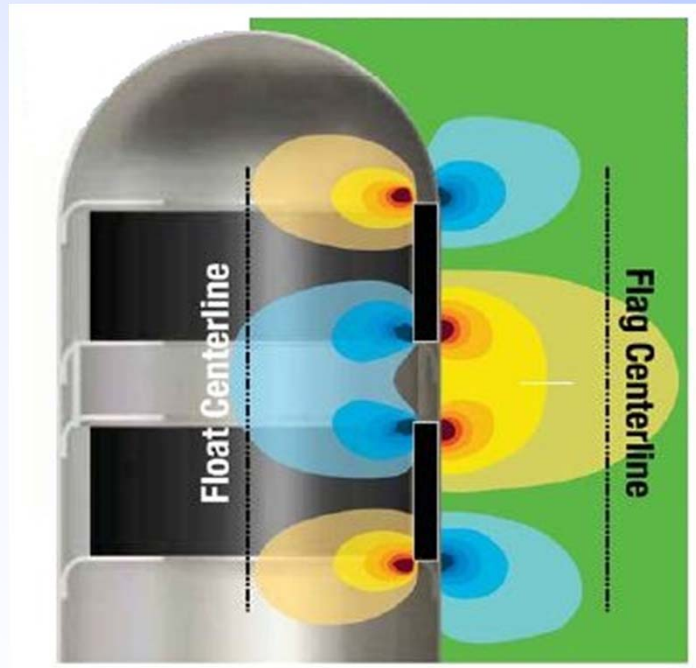
- **Flags Out of Sequence**
 - Weak magnetic coupling; float “decouples” from indicator assembly
 - Operator cannot discern where the actual level is
 - Requires a manual reset by the operator, drain the gage, or
 - Wait until the float cycles again
- **Loss of Control Devices**
 - Transmitters error
 - Switches don’t trip



Magnicator Float

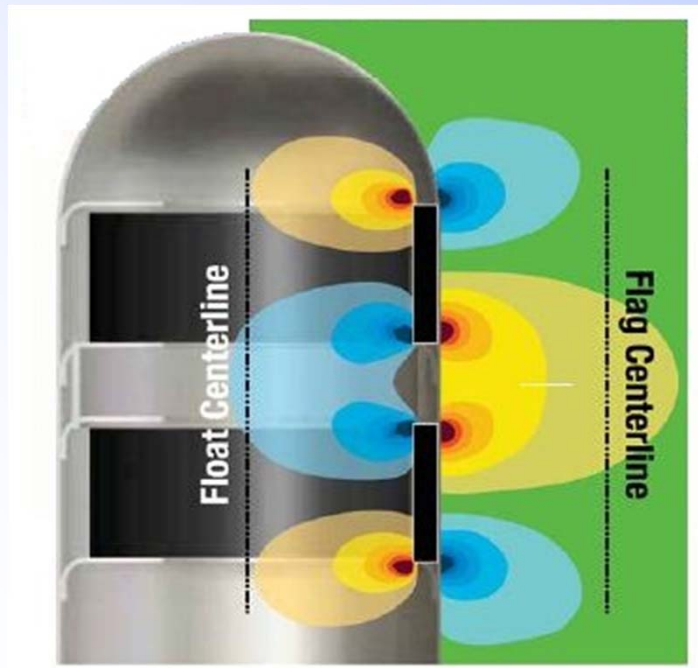
Magnet Arrangement

- **Jerguson Design**
 - Two 360° Annular Alnico 8 Ring Magnets w/ North Poles Opposing



Reliability of Magnet at the Flag

- **Jerguson Design**
 - Regardless of pipe schedule, the magnetic field at the flag and transmitter needs to be the same strength to retain reliability.

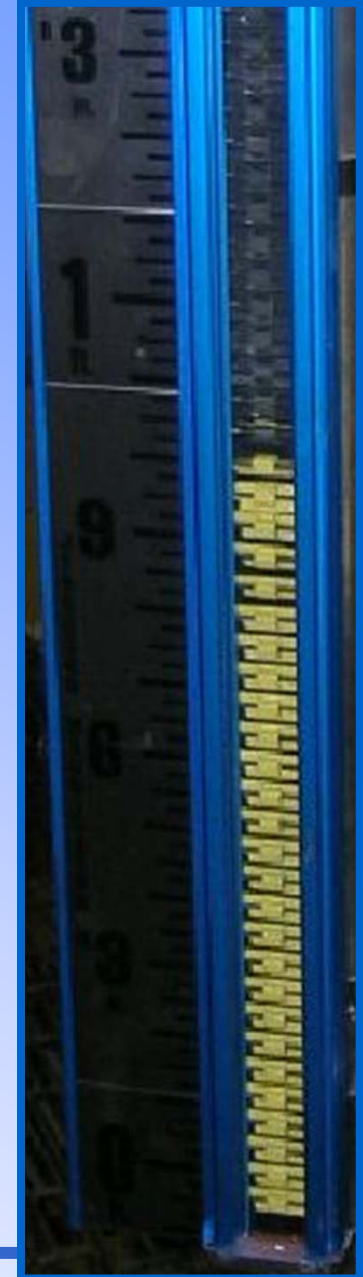


Each individual float is tested for strength at its own gage's indicator.



Indicator - Flag Style

- Aluminum anodized housing with SS flags
- Black for gas space and yellow for liquid
- Optional flag colors available
- Each flag has its own magnet
- Extremely shock / vibration resistant



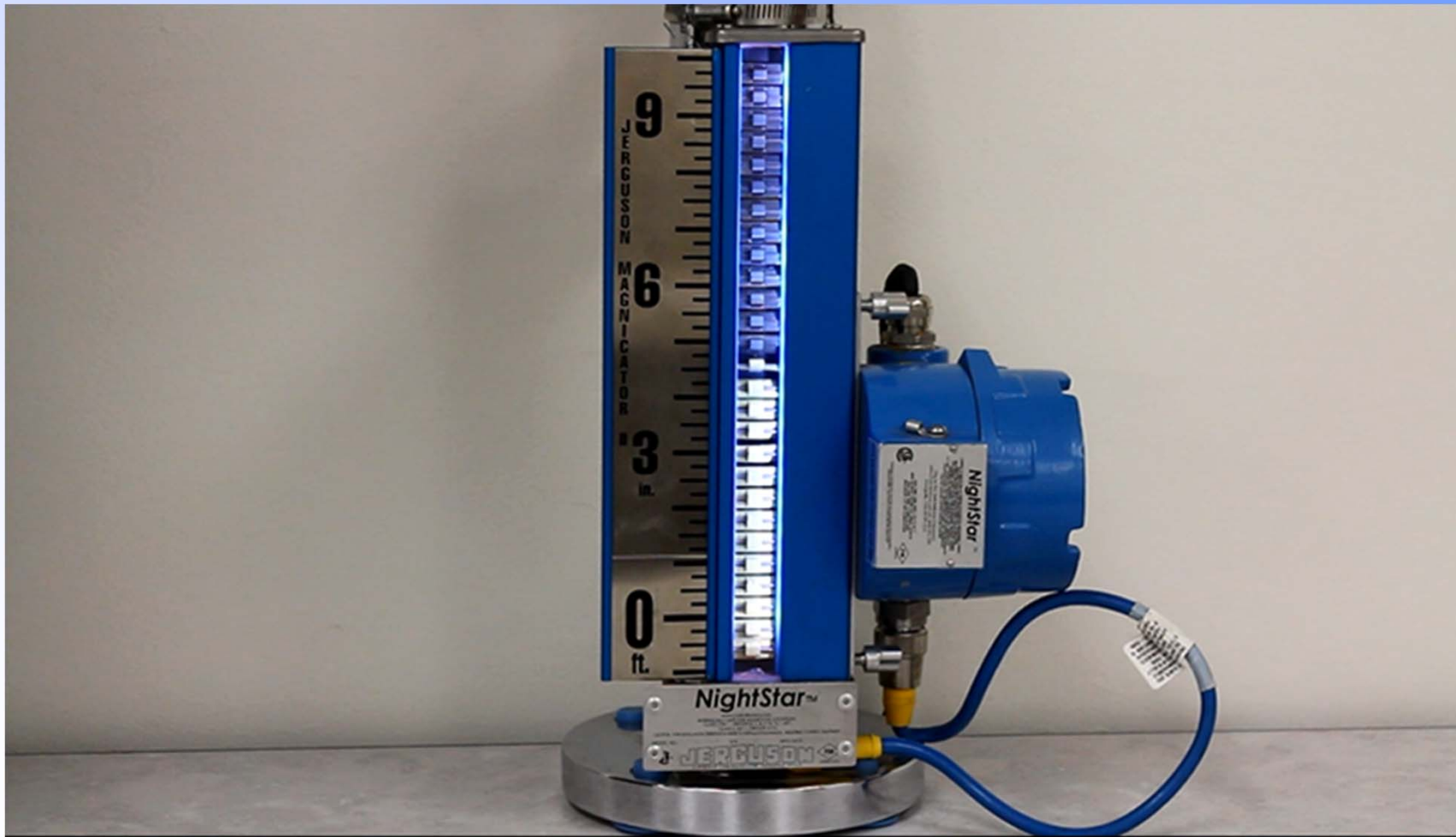
Indicator – Flag Style

Flag Design

- **Jerguson Design**
 - One Piece 304SS Precision Stamping
 - High Temperature Safety Yellow Painted Finish
 - 304SS Rotation Pin
 - Dual Rotation Points
 - Individual Ceramic Magnet in Each Flag
 - Active Magnetic Field of 200 Gauss at Leading Edge



Reliability: Magnetic Circuit



Indicator – Flag Style

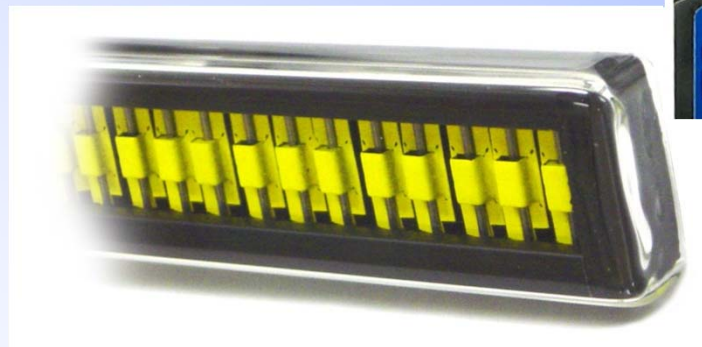
Hermetically Sealed Flag Indicator

- **Features**

- SS Indicator Flags
- 316SS Indicator Housing
- Purged with inert gas prior to sealing
- Polycarbonate tubing with epoxy-sealed end plugs to 500°F (260°C) process temperatures
- Glass tubing with 100% fused glass end seals to 1000°F (537°C) process temperatures

- **Applications**

- Offshore
- Cryogenic
- Chemical Wash Down
- Severe Environments



The Anatomy of a Magnicator High Pressure Sealed Floats



- **Unique Spherical Design**
- **Two Models**
 - Pressure Rating 3500-psi [HP]
 - Pressure Rating 1500-psi [MP]
- **Temperature Rating 600°F**
 - Options to 1,000°F
- **Minimum Specific Gravity**
 - 0.50 for HP Model
 - 0.35 for MP Model
- **Reduced Ground Clearance**

Reliability in Nozzle Designs



Saddle Pipe Nipple Construction

This is standard for all 150# and 300# Magnetic Level Gages with Flanged or Male NPT Process Connections



Reinforced O-Let Construction

This construction utilized self-reinforced fittings (ASME rated o-lets) to comply with ASME B31.1 and B31.3 piping code requirements. This is standard construction for all 600# flange classes and higher. Note that thread-o-lets are also used for FNPT process connections on 150# and 300# class gages.



Full-bore Butt-Weld Tee Construction

This construction method is typically utilized when specifications require a full-bore for 2" Process Connections (or larger) without a reduction or constriction in the pipe nipple between the process flange and Magnetic Gage chamber.

Strength of design eliminates the need for additional brackets in most designs under 20 feet in length.

Reliable Chamber Design

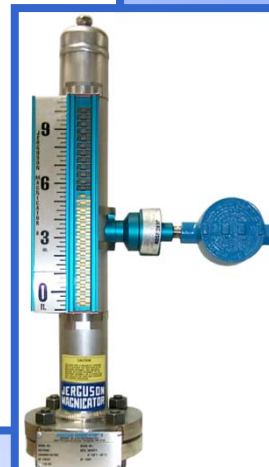
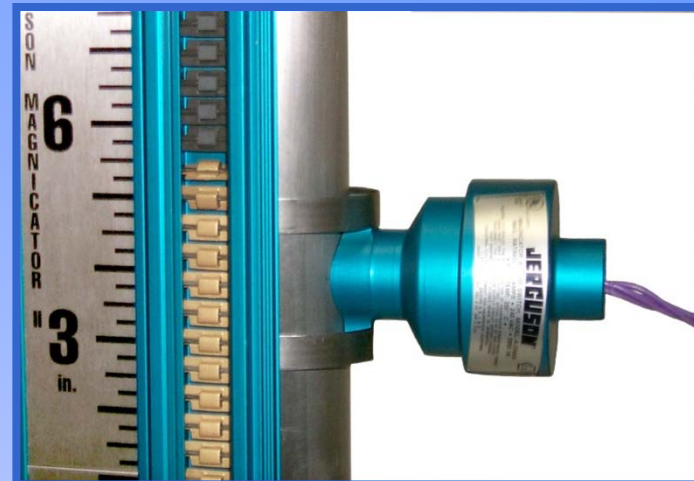
Key Features

- Standard 2 1/2" Sch. 40 Pipe
- Optional 2-1/2" Sch. 80 or 3" Sch 160 for high pressures
- All designs comply with ASME B31.1/31.3
- Third party verification by PE
- Chambers hydro tested to 1.5x ASME flange rating
- ASME/ANSI Sec. IX certified welding



SAS-16 Switch

- Snap Action
- No Cams or Springs
- High Vibration Resistance
- High Current Switch
- SPDT Switch Configuration
- 16 amp max @ 120 VAC
- 10 amps max @ 240 VAC
- UL and CUL Listed Class 1, Div. I Gr. A, B, C&D NEMA 4X



MTII-4200- Magnetostrictive Transmitter

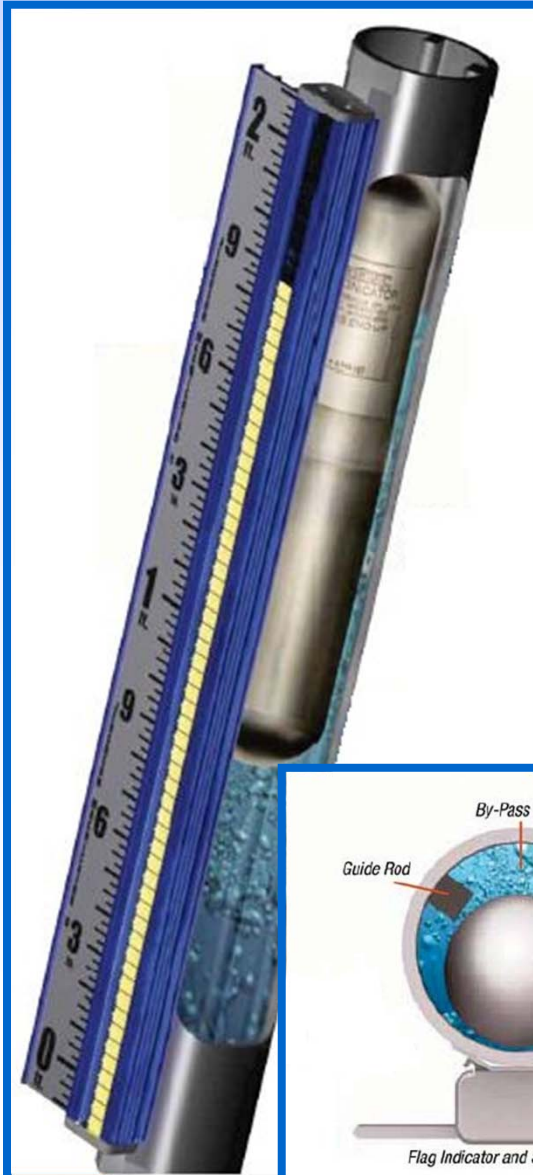
- 4-20mA Hart Protocol Standard
- Foundation Fieldbus Option
- .001" resolution continuous output
- FM - Class 1, Div. I, Grps. B, C, & D;
Class 1, Div. II, Grps. E, F, & G
- Field Adjustable zero and span
- ATEX / CSA Approvals Available
- External Mounting
- Window Enclosure Standard



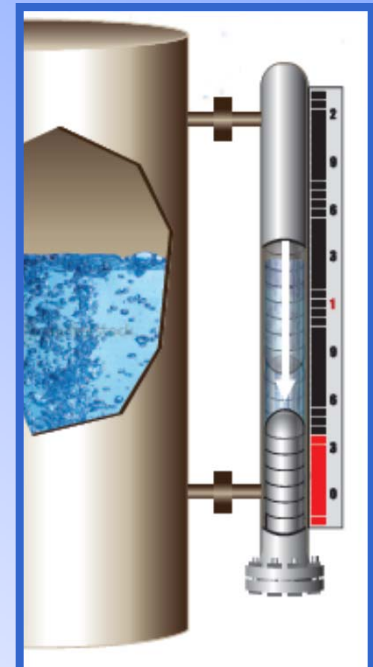
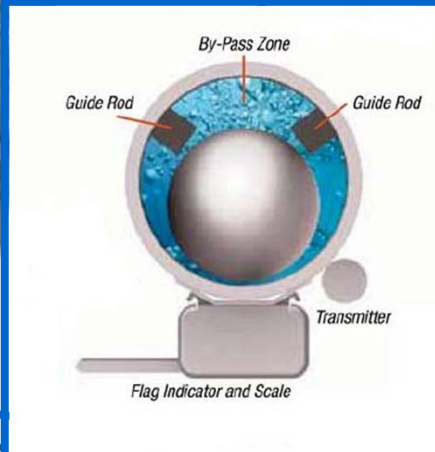
Flashing or Boiling Service

When does this occur?
Special MLG Chamber
Glass Gage Options

FlashProof Chambers



- For Boiling/Flashing Applications
- 3" S40 Chamber with Vapor By-Pass Guide Tubes
- Allows entrained gases to pass behind float – prevents float from sinking
- Applications:
 - All Cryogenic
 - LNG/LPG
 - Propane
 - Methane
 - Butane
 - Anhydrous Ammonia & other refrigerants



Dirty Service

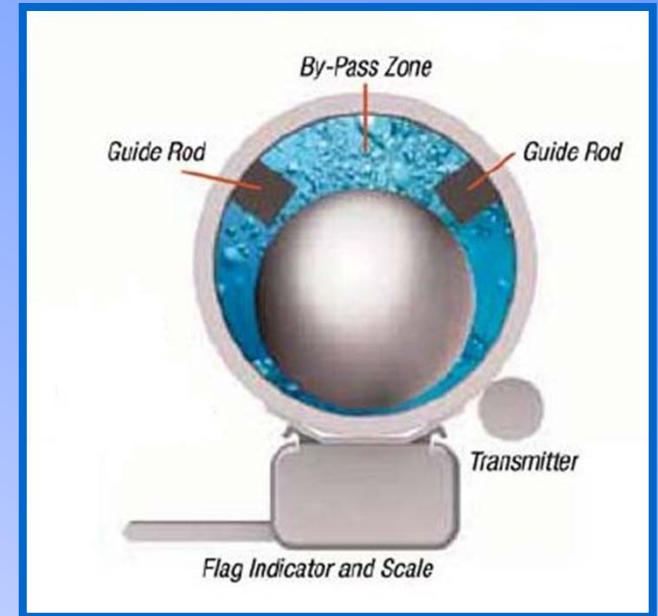
Develop Coatings

Solid Particles

Flushing Requirements

FlashProof Chambers

- Over-sized Chamber for Dirty Service
- Provides significant free space for solids
- Allows for Flushing without Float Removal
- Example: Reduce Crude Drum (Receives heavy bottoms from Distillation Tower and feeds Vacuum Tower.)



“The chamber has significantly quieted down the “false” level fluctuation, due to boiling of the product in the existing chamber causing float to remain at bottom or surge up and down. Now process and maintenance can use it to compare dP level instrument calibration for level control.”

Combined Technology

Magnetic + Guided Wave Radar

Glass Gage + Guided Wave Radar

MGWR

Magnetic + Guided Wave Radar

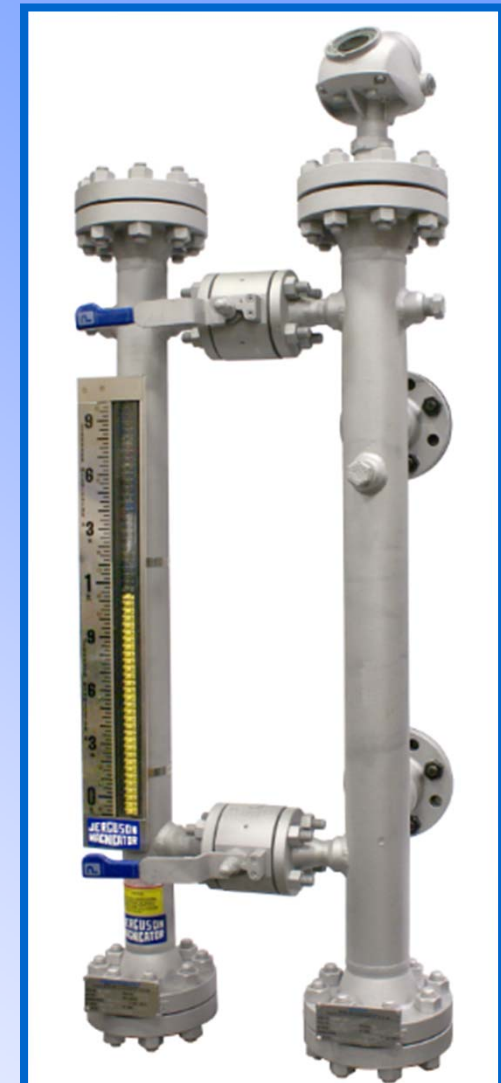
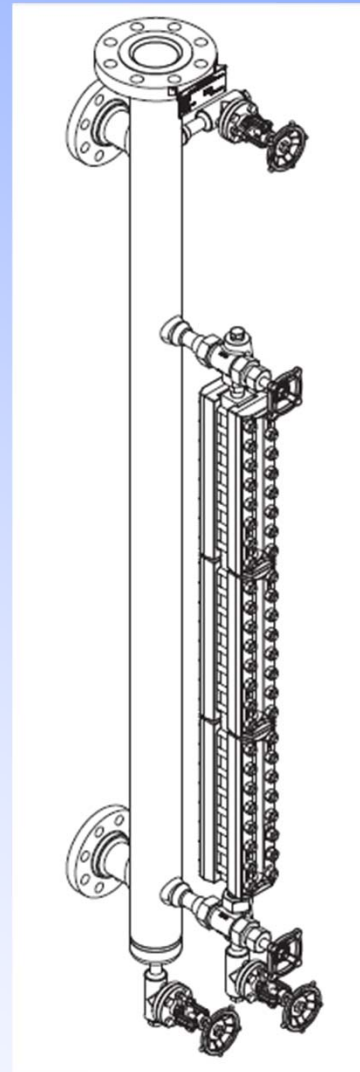
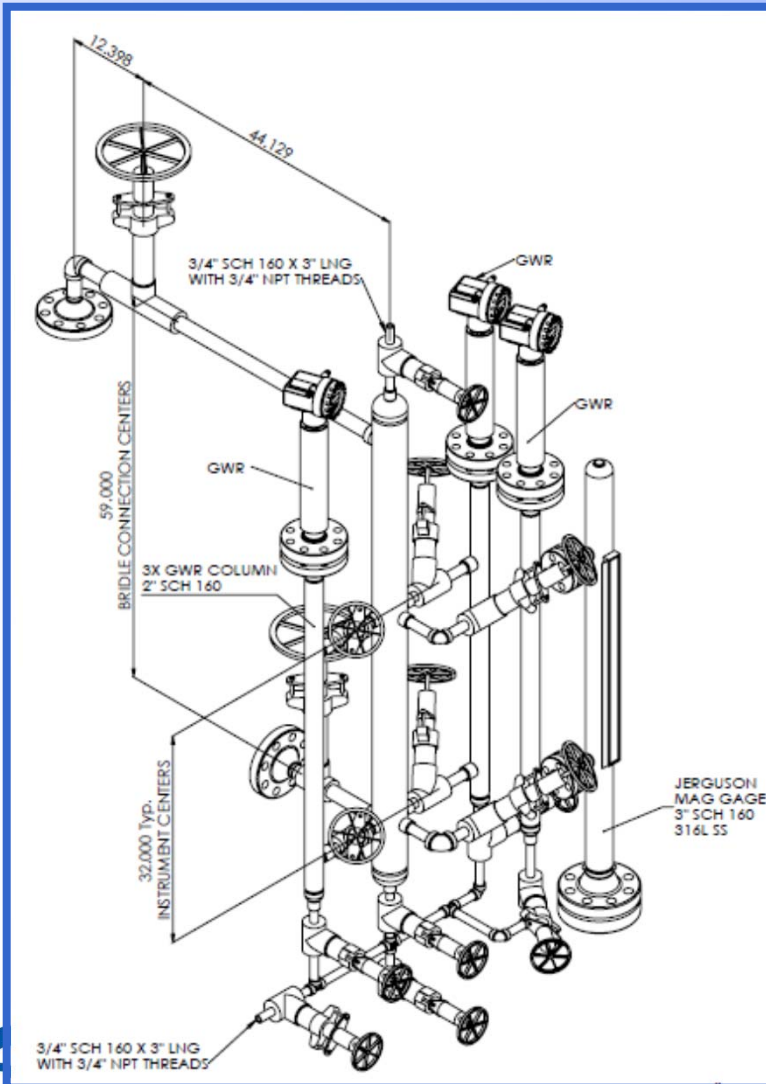
Redundant Level Measurement

- Magnicator is a Float / Density based system
- Guided Wave Transmitter is independent of density
- Changes in specific gravity do not effect the output of the guided wave radar
- Models available with gas compensation
 - With this feature, the GWR transmitter is not effected by changing dielectric values



MGWR – Guided Wave Radar

Examples



Questions

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