ISHM 2021

Class 1270
Orifice meter- Operations and Maintenance

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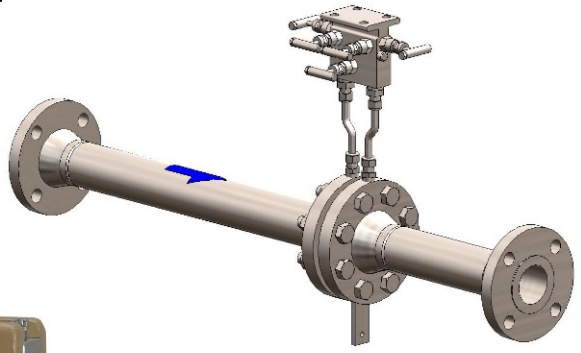
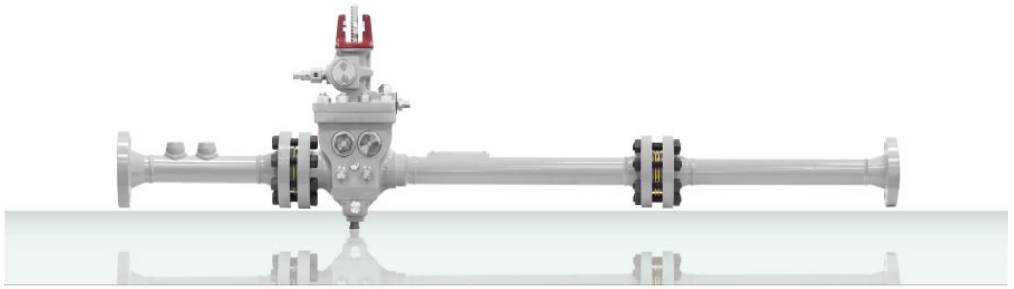
The Purpose

- Commonly used orifice fittings
- Accurate and efficient measurement through proper maintenance
- Recording the Data
- Testing for accuracy

Orifice Meter types

- Flange Orifice
- Single Chamber
- Dual Chamber





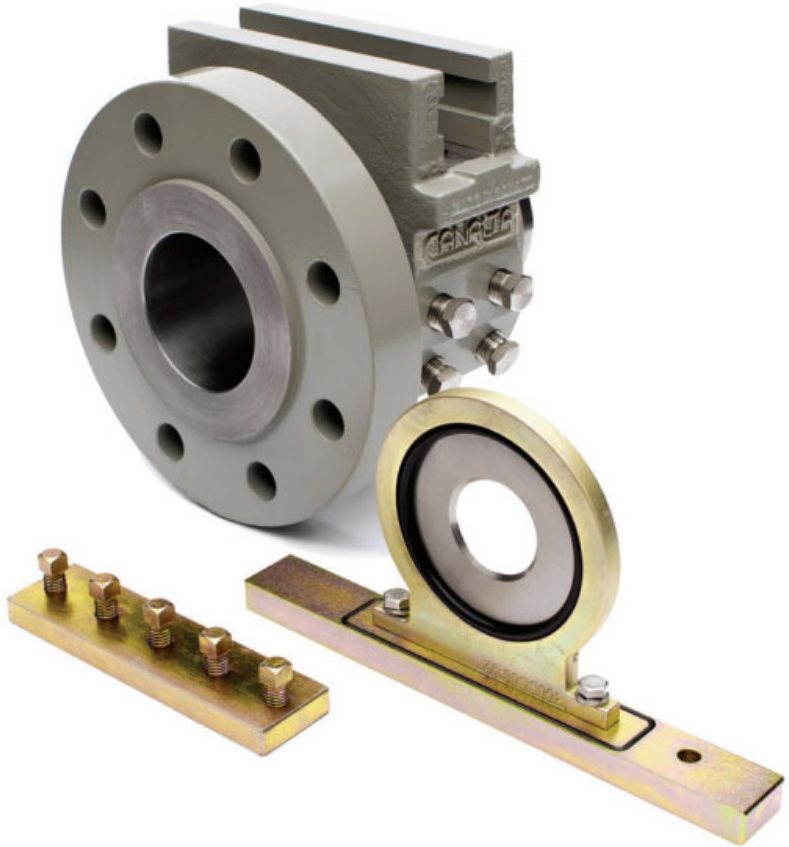
OFU Orifice Fitting

- Economical
- Very simple by design
- Labor intensive

- Less likely to be compliment with EPA standards

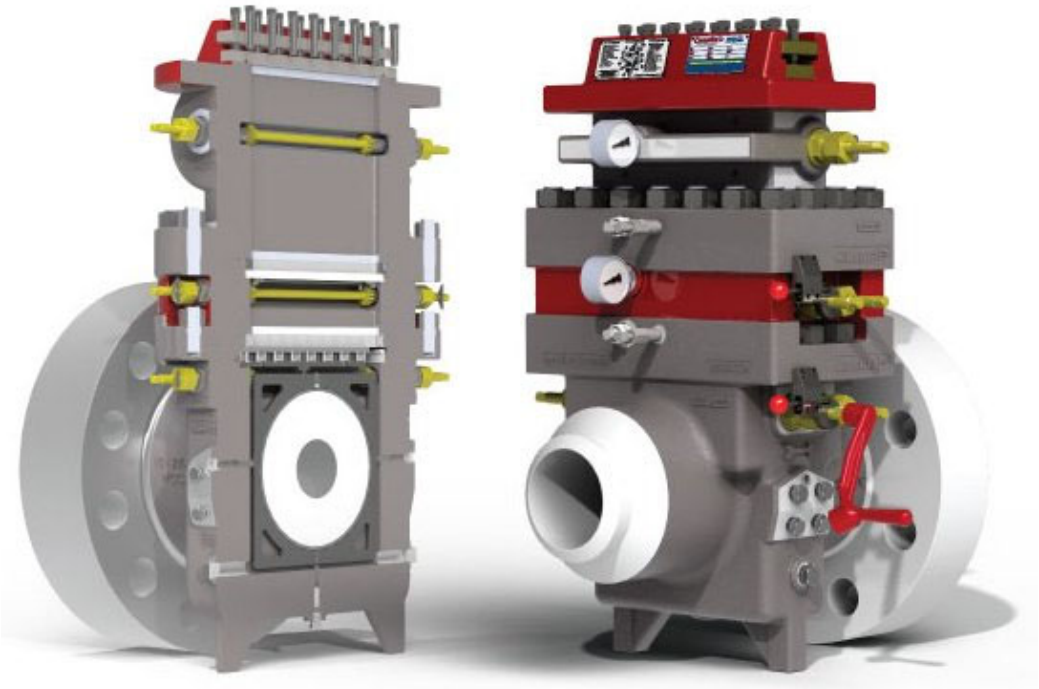
Single Chamber Fitting

- Quick and simple to operate
- Cost effective
- Less moving parts
- Gas flow is stopped for plate inspection

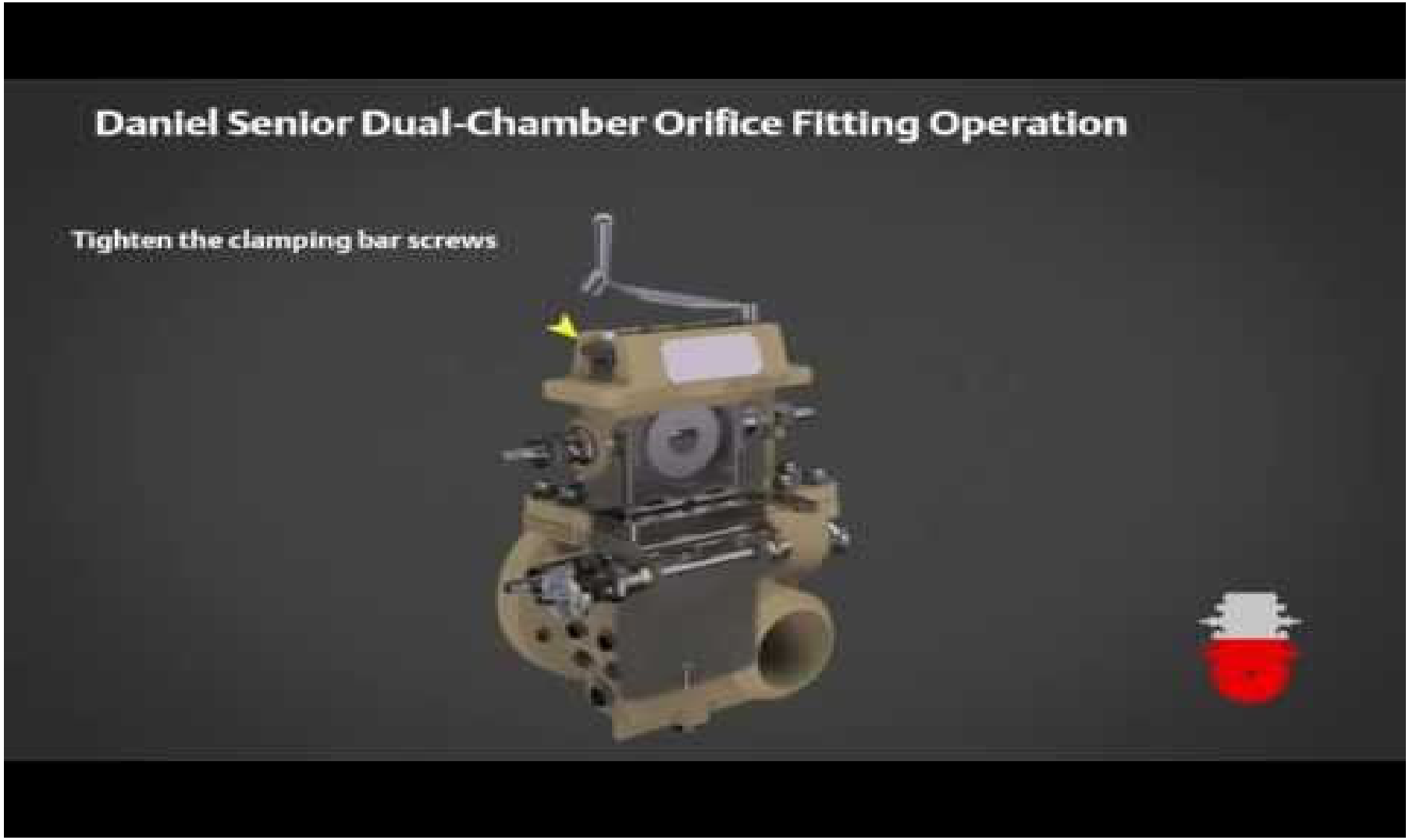


Senior Fitting Operation

- Most efficient and desirable
- Doesn’t interrupt process flow during inspection



Senior Fitting Operation

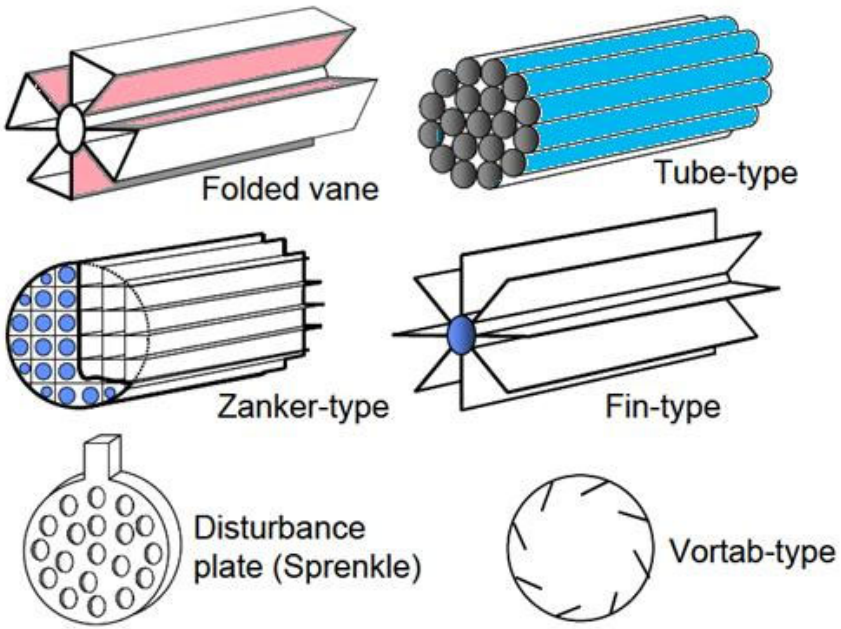


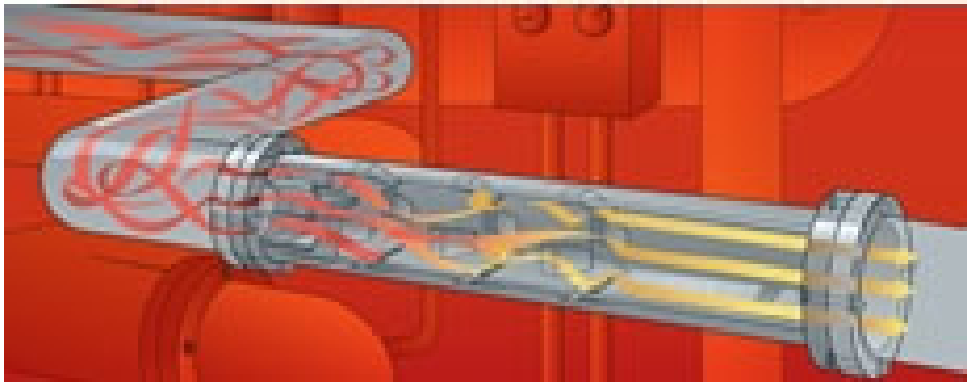
[Daniel Senior Orifice Fitting - Operational Sequence of Removing an Orifice Plate Under Pressure - YouTube]

Primary Element

- Meter tube

Conditioning Gas Flow



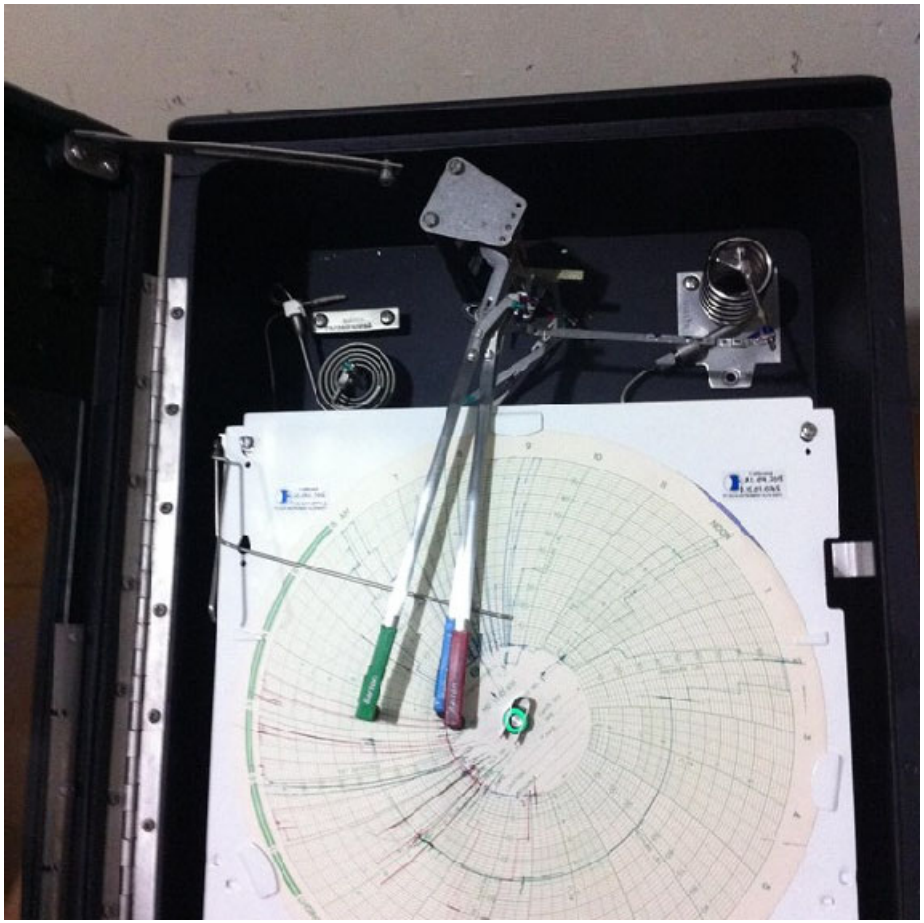


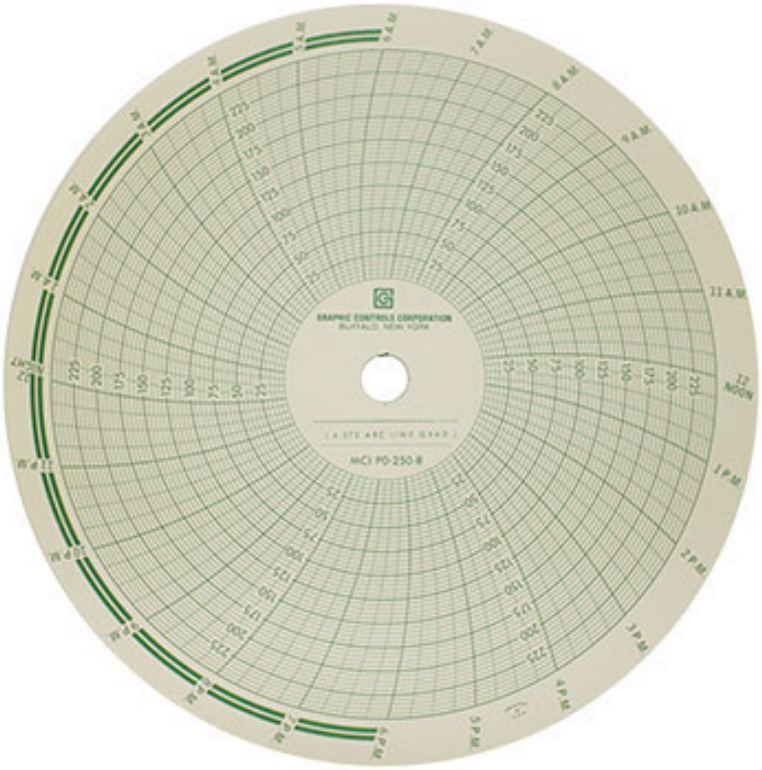
Secondary Element

- Recording device for the process values
- Static Pressure
- Differential Pressure
- Temperature

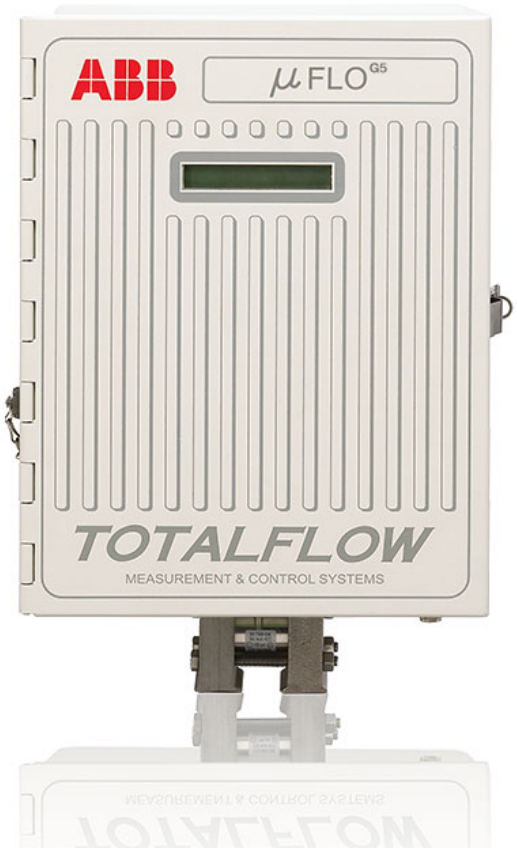
Electronic or Mechanical

Dry Flow/Mechanical Recording





Electronic Flow Meter



Measurement Station Inspection

Be Observant!

- Check Primary and Secondary Elements
- Don’t overlook the obvious
- Be accurate and honest in checks

What to look for?

- Are the 3 process values reading accurately?
- Are pens marking? Or EFM updating?
- Is the chart turning? Is the time and date correct?
- Is there gas passing through the station? How much?

What to look for?

- Are there any leaks at or around the station?
- Have there been any modifications done? (compression, dehydration, control valves)

Inspections

- Check the orifice plate
  - Is it dirty?
  - Does it have nicks, cracks
  - Should be smooth and flat
  - Is the plate orientated in the run correctly?
  - Is it the correct size, mic in a X pattern

  Be attentive and follow best practices

  Seal ring should be pliable and free of cracks

Inspections Continued

- The plate can be a indicator of inside of the tube
  - Example: fluid, carbon buildup, rust and other debris
- Flow conditioner should be clean and free of debris
- Inspecting the tube annually is recommended but can be difficult due to time resources

Inspections Continued

- Test the meters
- It is very important that a test of the equipment is done before adjustments are made.
- Start by recording the flowing condition of the station.

Inspections Continued

- Check the differential zero under pressure
- Check static pressure at zero
- Check all three process values to scale
- Log Errors “As found”
- After error are corrected, points should be logged “As Left”

Finishing Up Inspections

- Be sure the station is back in service
  - Pens marking
  - Chart nut tight
  - EFM out of “hold”
  - Manifold in service
  - Taps open
  - Check the volume

Test Report

- Official documentation of meter station
- Documents should signed
- Fill out all documentation on location
- Sent to integration office or proper department

Summary

- 3 types of orifice meters
- Primary and Secondary Elements
- Values to be recorded during test
- After the checks are complete, what should be calculated to verify accuracy?