

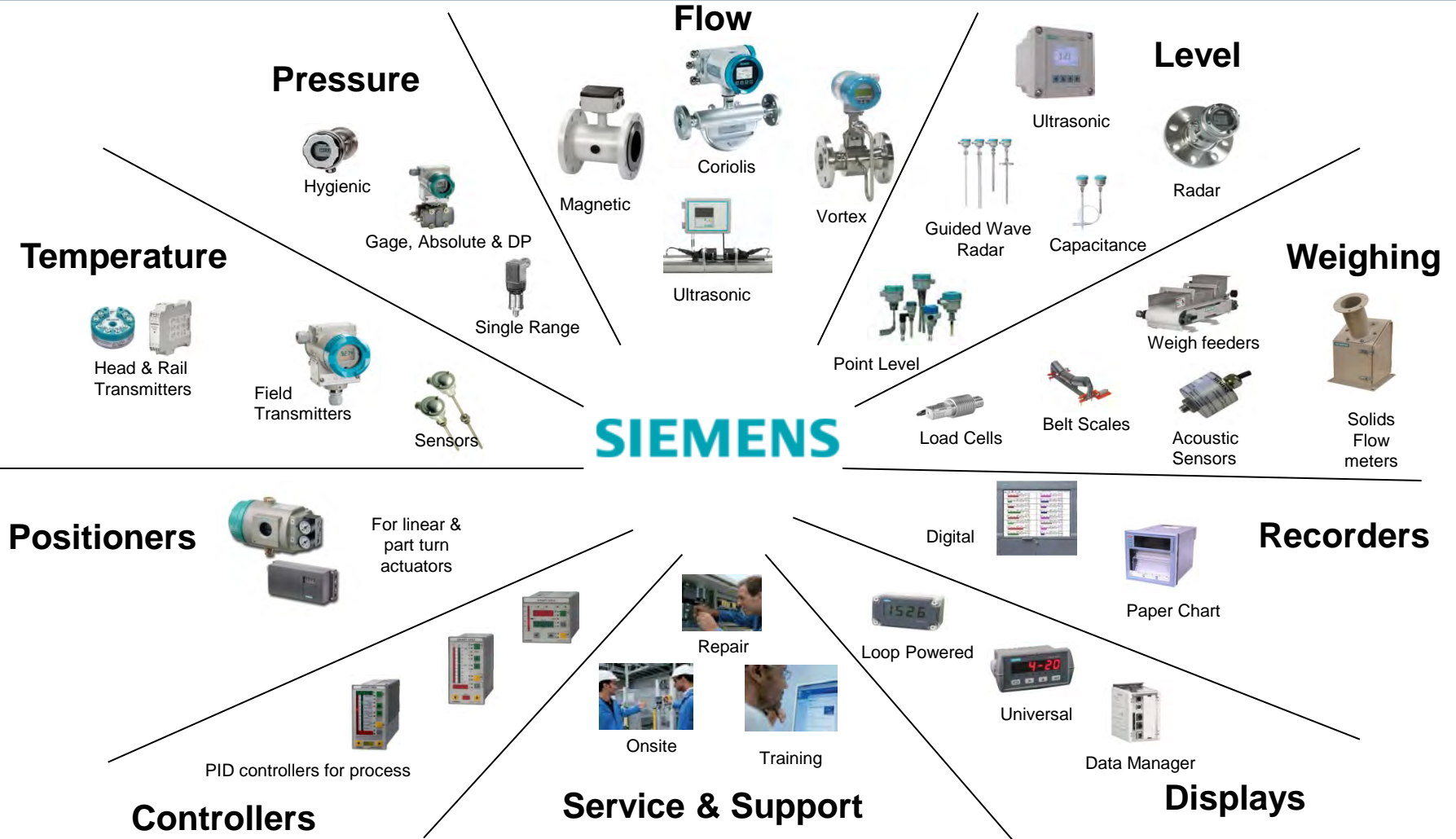


SIEMENS



# Manufacturing on the Skids? Specialty Coriolis meters to the rescue!

# Siemens Process Instrumentation

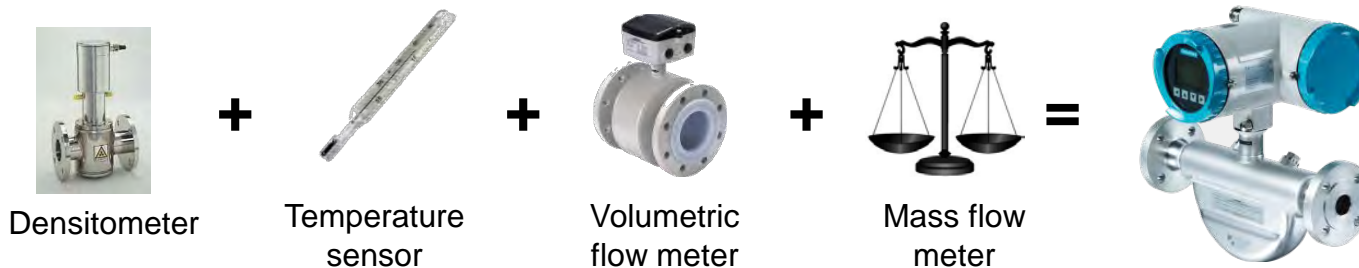


## Why Coriolis flow sensors?

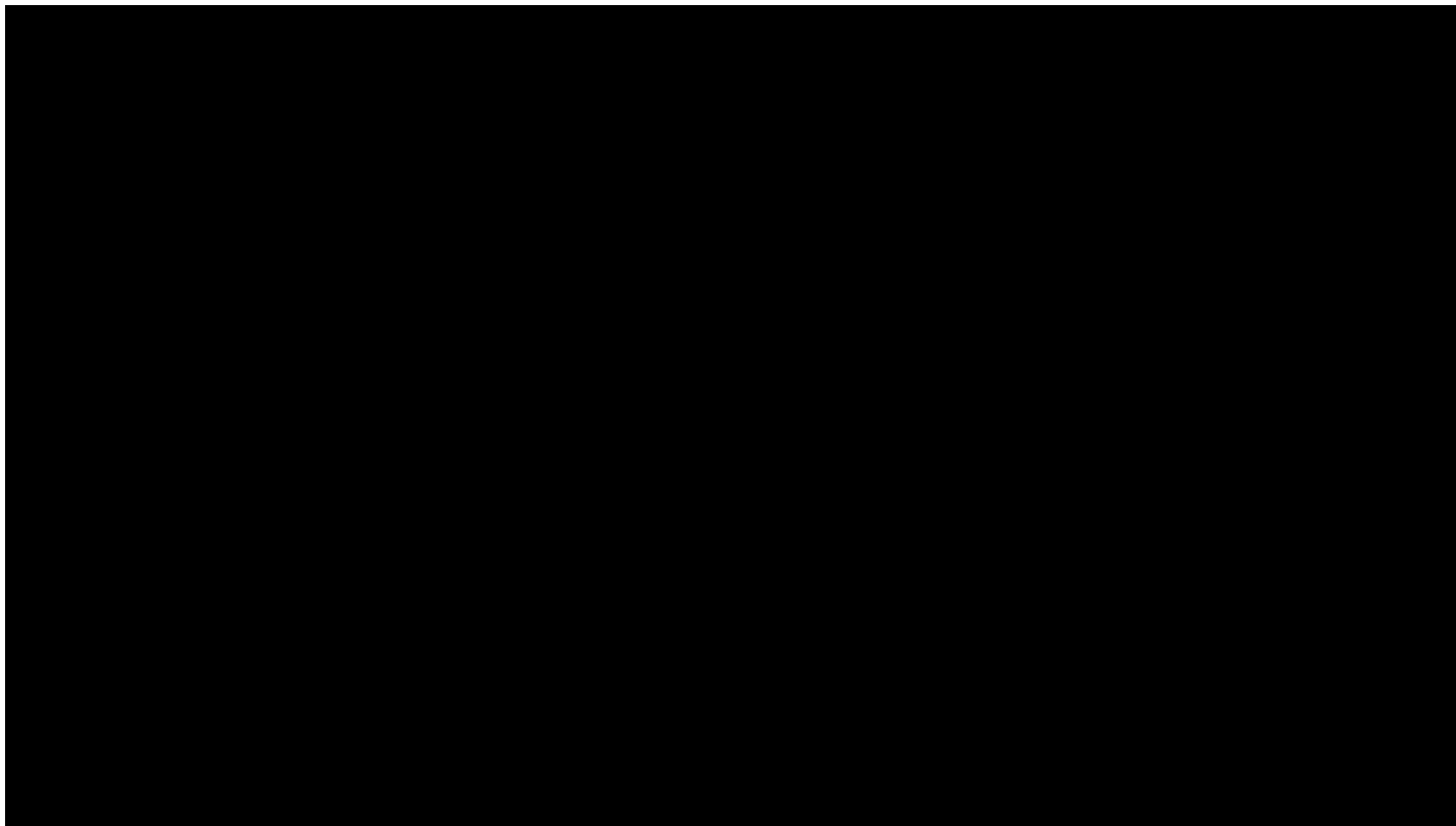
### Coriolis Flow Measurement:

- Provides the most accurate flow meter technology (0.1% of rate acc. on flow)
- Provides temperature measurement at flow measurement point.
- Provides direct mass measure independent of pressure and temperature
- Provides an real time density corrected volume flow measurement
- Provides an in situ density measurement with or without flow

**Siemens Coriolis sensors are multi-parameter devices:  
Meaning one device can measure all these all at once:**



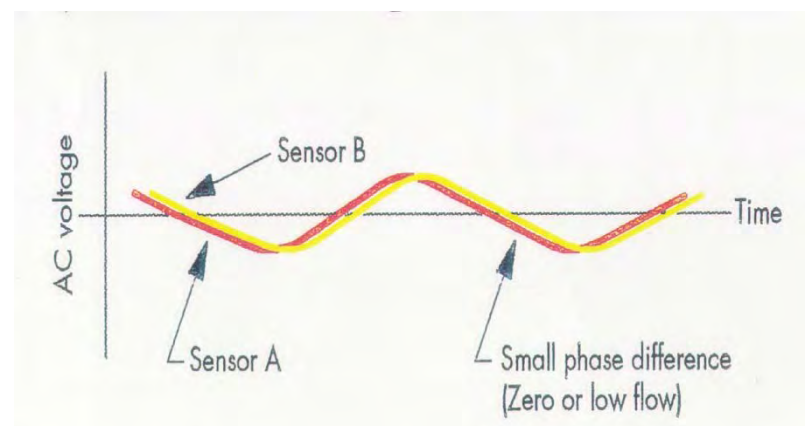
## Coriolis, how does this thing work?



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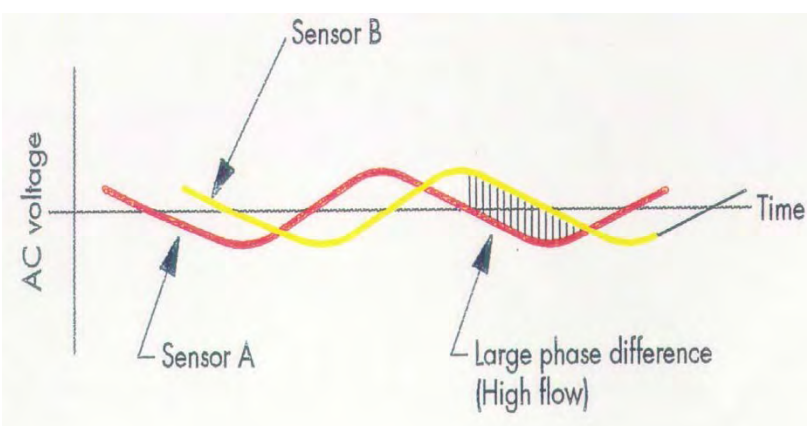
## Coriolis mass flowmeter signal detection

Phase difference with zero flow  
(Detectors only shown)



$$Dt = 0$$

Phase difference with flow



$$qm = K \times Dt \text{ [Lb/h]}$$

## Benefits with Coriolis

### Direct mass flow measurement for both liquids and gases

- No compensation necessary for temperature or density changes in your flow
- You can use the same kind of meter for either gas or liquid
  - A pound of oil and a pound of gas weigh the same!☺

### Measurement is Independent of fluid characteristics

- Flow profile does not affect measurement – No straight run before or after needed
- Viscosity is not an issue – If you can flow it we can measure it!!
- Easy to install and change out – Programing stays in the PLC/DCS
- No mechanical parts to fail
- Long term stability – Set it and forget it..

### Wide dynamic range

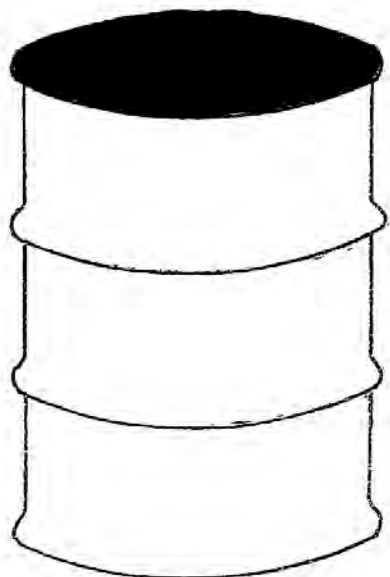
- Turn down of 100:1 easily enables measurements over a wide range
  - (250:1 , 500:1 or even greater ratios are possible depending on flow specs)

### Small Size

- Sensor is small can be fit into tight spaces when real-estate is at a premium

## Why Coriolis a good match chemical measurement

Sometimes volumetric variables can bite you.....HARD!



Mass flow 0.10% error

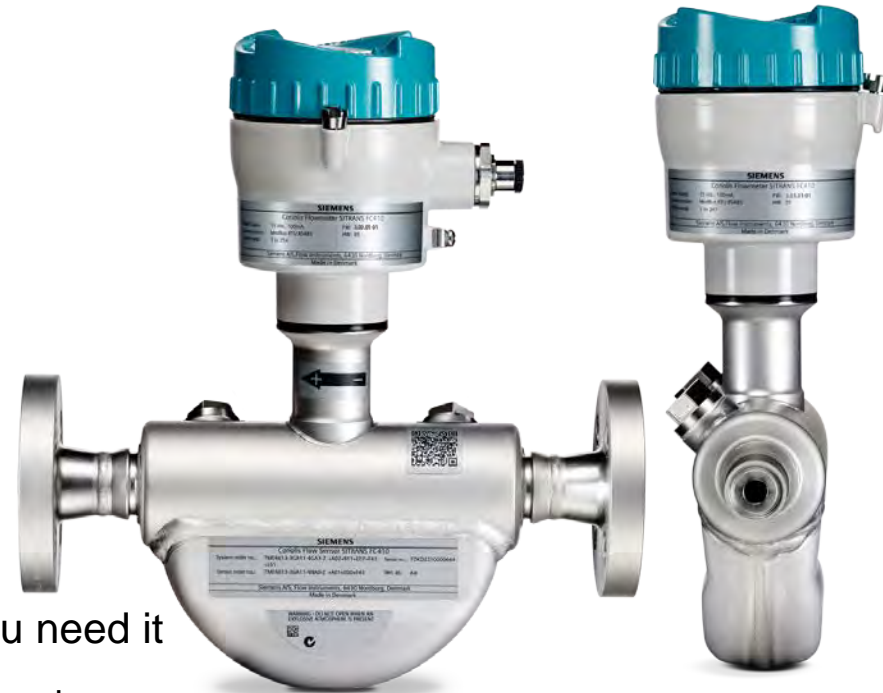


Volumetric flow  
+2.5 - 0.25 % error

Volumetric flow is subject to errors due to temperature, pressure and viscosity variations  
Coriolis mass flow simply does not care what the variables do..

# SIEMENS SITRANS FC410 - The smallest Coriolis just got smaller

- **Direct communication sensor to platform – No extra equipment needed**
  - ModBus RTU - 4-wire interface
  - Easy to install and set up
- **Process Variables**
  - Mass flow (lb.'s/min)
  - Volume flow (BBL42/hr)
  - Density (API S.G.)
  - Fluid temperature ( F° )
- **High speed digital communication**
  - Update rate 10ms (100Hz) – Data when you need it
  - Resistant to external noise from the pipe or ground



The SITRANS FC410 has a cable length of 2000 to 4000ft



## Why is digital communication important

### Digital communication Delivers...

- Reduced noise: Sensor signal is digitalized instantly
  - The reading you get at the sensor is reliably delivered to your process fast!
- More diagnostic data in real time
  - Alarms and limits easily configured
- Fast device change out
  - All the configuration data stays with the control system
- Ultra compact interface with the sensor :
  - Fits where no other Coriolis will
  - Intrinsically safe data connection
  - Plug and Play connector interface



DN15 / 1/2"  
from 10.5"

## SITRANS FC410

# HemiShape™ a perfect shape to handle oil or gas flow

### HemiShape™ – a hemispherical design

- HemiShape™ gently guides flows through the sensor. This ensures balanced quiet flows in both tubes

### Benefits:

- Greatly reduces chance of paraffin build up
- Provides a very stable zero point
- The balanced flow reduces noise and ensures strong signal-to-noise ratio even in turbulent or low flow conditions
- Low pressure loss allows easier process pressure management
- Cavitation at the inlet port is all but eliminated allowing for stable flow measurement



# SITRANS FC410

## Key value points

### Direct & straight forward integration

- SITRANS FC410 is pre-set to read all process values; without changing PLC code – **Independent of PLC brand!**

### Safety

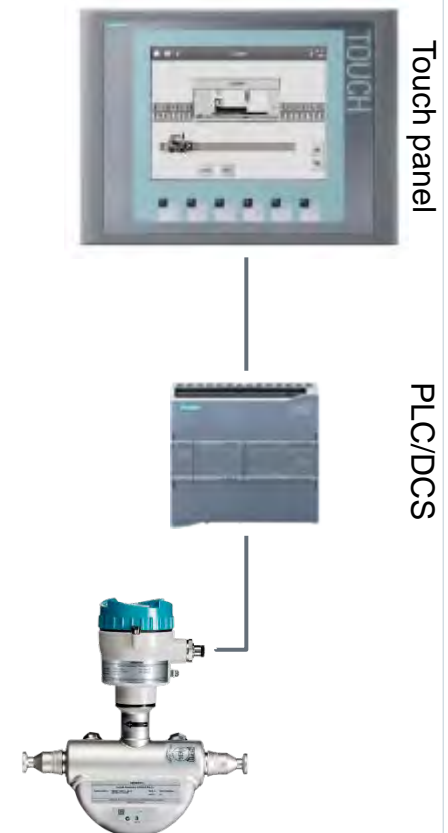
- Intrinsically safe construction
- FC410 is Class 1 Division1 FM approved

### Service

- Around-the-clock support from local specialists in 190 countries with easy online one click access by scanning QR code on the device

### Easy installation with:

- Compact and lightweight sensor
- Quick connect wire connections



# SITRANS FC

## Installation & integration made easy

### New installations:

- Requires only one-time PLC configuration  
No individual programming is needed when additional meters are added

### Replacement installations:

- PLC/DCS re-programming is a thing of the past as data formatting is standardized to existing PLC

### Installation time:

- Minimized due to multi-plug connections, and the shortest build-in length
- Get more in less space and weight



## Advanced Local User interface (If needed)

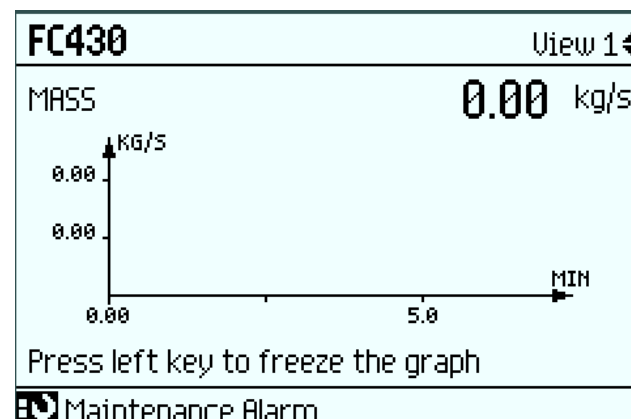
### Local User Interface

- Graphical capability – With trend charts or curves
- Useful diagnostics with description texts to tell you where to look
- Multi-languages including - Spanish
- Self explaining wizards pop up to assist set up
  - For commissioning
  - One touch re-zero or re-set total
  - application specific configuration, etc..



<b>Quick Commissioning</b>	
↳ <b>About</b>	1/7
<p>The Quick Commissioning wizard will guide you through configuration of parameters essential for your application. You configure parameters essential for your application by selecting the configuration path and sub-wizards appropriate for your application.</p>	

Quick commissioning wizard



Trend curve

## With Local User interface (if needed) Transmitter platform - Audit trail

- Information is time-stamped per individual event
- Alarm history
- Parameter change history (time and parameter logs in detail)
- Firmware updates history
- Change history is logged by access type:
  - LUI menu (Local User interface)
  - Host via HART
  - Service port via USP interface with PC

### Language

Timestamp:	1900-01-01 00:00
Host:	Local User Interface
Parameter id:	6
Value before:	English
Value after:	Deutsch

Audit trail will enable full product audit and logging.

## Custom-designed electric heating jacket for sensors

- Custom-designed for SITRANS FC410/430 sensors in sizes DN15-80
- Will maintain up to 120 deg F differential between sensor body and ambient temperature (max temp is 392 deg F)
- Not for use in C1D1 areas
- Heating jacket's purpose is to make trace heating of the process piping simple for users to ensure stable sensor & media temperature



Heating jacket and 5 m controller lead

Electric controller and power cable

# Customer Application

## Ship board chemical loading



SIEMENS

### Background:

Ship builder required a reliable chemical monitoring system to evaluate and log inventory as it was loaded and off loaded. Status while under way was additional critical data that.

### Challenge:

The monitoring system needed to be very accurate, small in stature and easy to maintain. At the same time being very easy to use also it needed to be tamper resistant. The system needed to be designed to maintain control the inventory.

### Siemens solution

The Siemens FC400 Coriolis sensor's bi-direction direct mass measurement made positive and accurate inventory control, drop in simple. The FC400' small size permitted simplified installation in the tight confines below decks. The ModBus interface provide the fast and accurate data on demand as well as supporting simplified installation and servicing if needed. The Siemens sensors provide a reduced pressure drop and a reduction in the chance of clogging from material build up in the sensor pipe.



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