FluiMix™

MIXING
MEASUREMENT
BLENDING
MULTIPHASE

CONTROLLED MIXING WITHOUT TANKS, TIME OR PRESSURE DROP

FluiMix™

Norwegian Parent Company

Delta P (Pump Technology)

M Pumps Italy

Norwegian Oil Gas Market

UK R & D Centre

Partnership With Sentry Equipment

Crude Oil Samplers

FluiMix Licensed Products

50 Units – North Sea, Iraq, Kuwait

FluiMix Expertise

Only Jetmix company with

True Pump Capabilities

Own Laminar Transition Zone Flow

Loop for Single to Multiphase

FluiMix Technology

- In Line Mixer
- Zero Pressure Drop
- Limitless Turn Down
- Any Viscosity

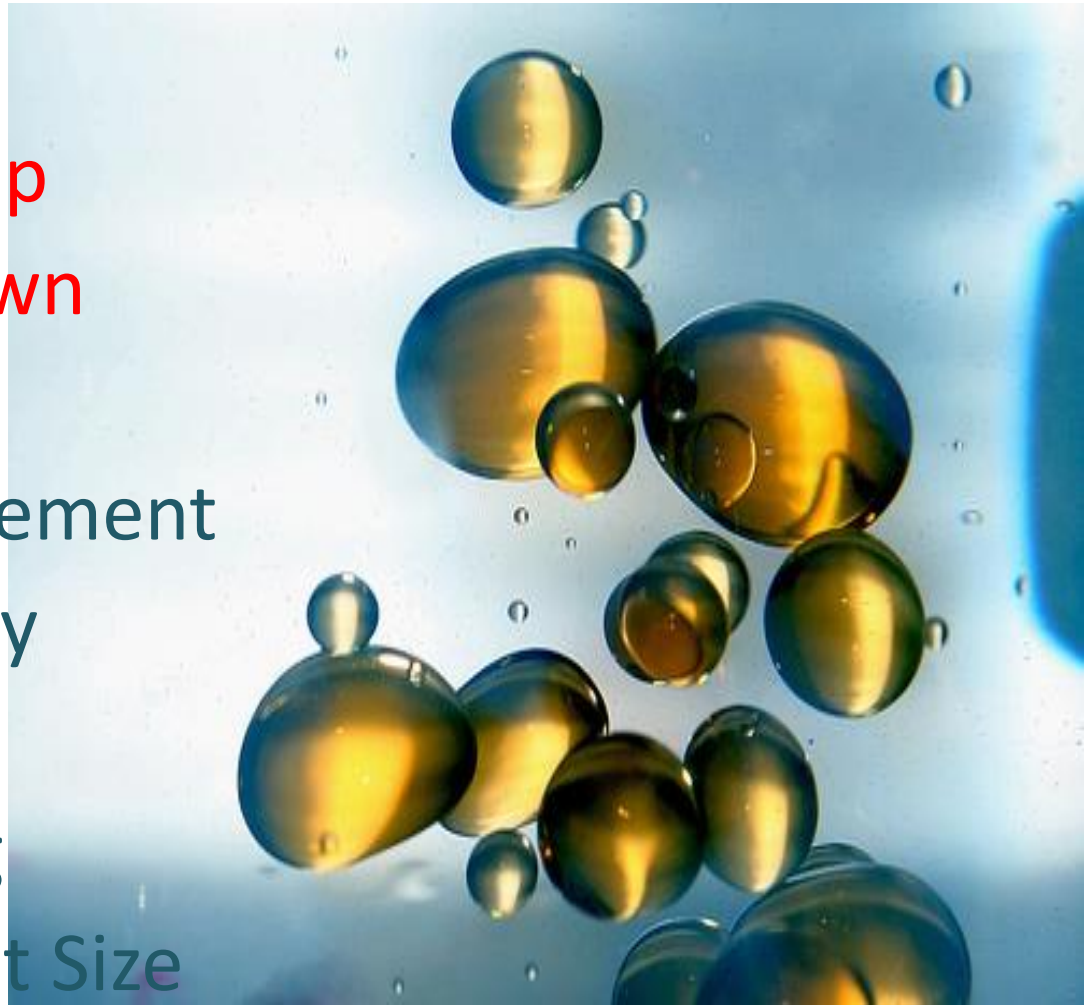
✓ Improves Measurement

✓ Improves Accuracy

✓ Cost Saving

✓ Controlled Mixing

✓ Controlled Droplet Size



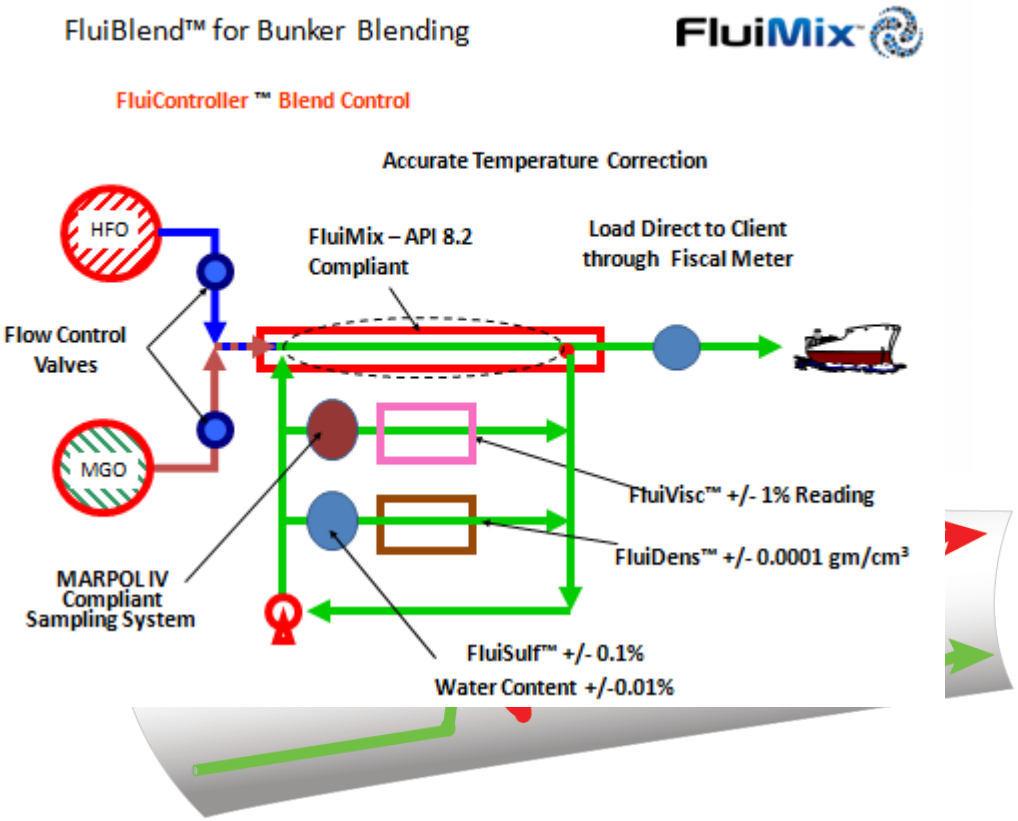
FluiMix R&D

- Only Permanent Facility in the World
- 4 – 12” Production Well Head
- Cranfield University
- 0 – 99.9% Water
- 0 – 99.9% Gas
- 0-99.9% Oil
- 0 – 8000 cSt

ONLY TRANSITION AND LAMINAR 23 m x 12” FLOW LOOP IN WORLD

Product Range

- Sampling and Measurement Systems
  - API Compliant System
    - Produced Water
    - Crude Oil
  - Samplers
    - Electronic Probes
    - Samplers
  - Refined Product Sampling
  - Sulphur Measurement
- Blending
  - Crude Oil
  - Bunker Fuel
- Multiphase (Development
  - Sampling (Development)
  - Metering



Component Technology

- Body
  - 2507
  - H_2S Resistant
  - No Deregulation
- Brinell Hardness
  - 263 vers 130
- Seal Technology
  - finger-spring activated, asymmetrical
- Critical Surfaces
  - DLC
    - HV > 2,500
  - Carboxysiloxane
    - Lubricity (coefficient of friction) 0.378
    - Wear resistance (x10-5mm3/N m) 6.13

European Manufacturing Base

- **EN-ISO 9001:2008**
- **EN-ISO 14001:2004**
- **EN-ISO 18001:2007**
- **Achilles**
  - **2011-2012**
- **Locations**
  - **Norway**
  - **Eire**
  - **Canada**
  - **Saudi Arabia**

FluiMix™

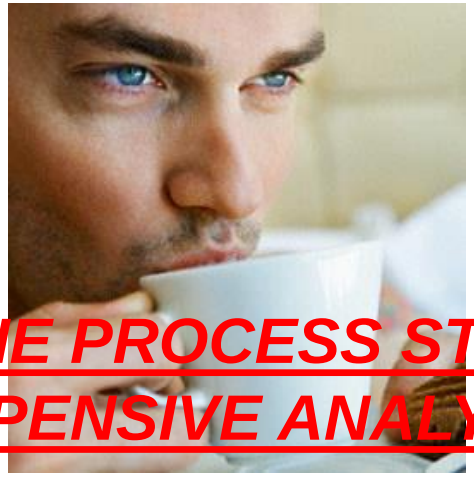
MEASUREMENT NEEDS MIXING

FLUIMIX CONTROLLED MIXING

WITHOUT TANKS, TIME OR PRESSURE

YOUR STIR YOUR COFFEE DON'T YOU?

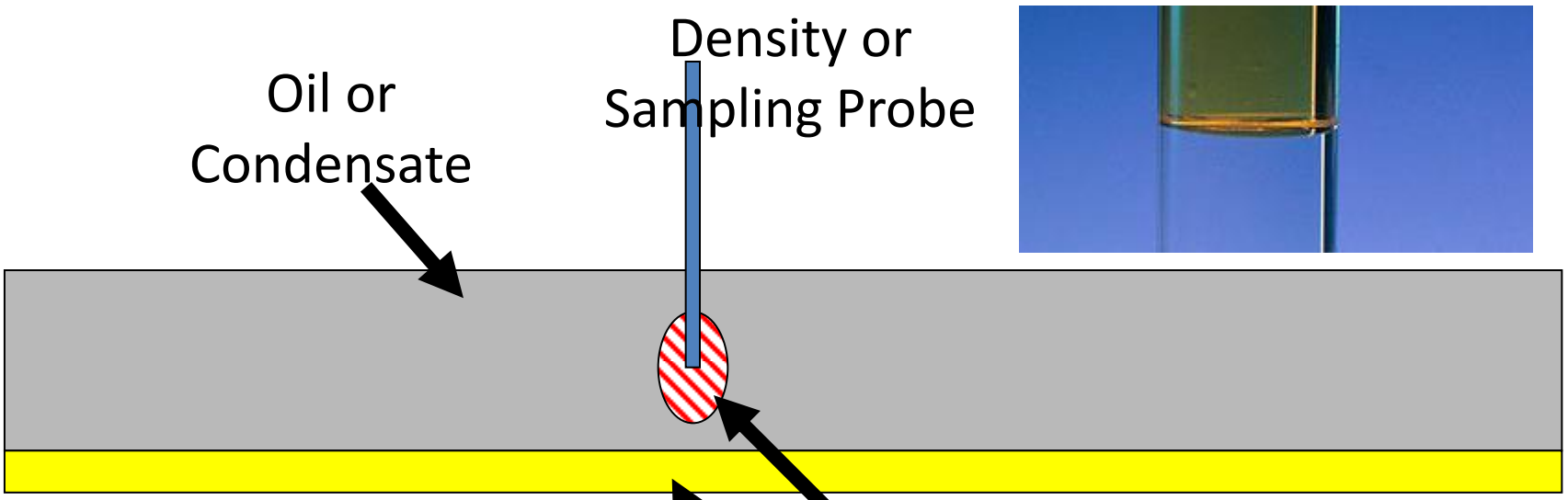
AAHHHHH



URGHHHH

WHY DON'T YOU STIR THE PROCESS STREAM WHEN YOU BUY AN EXPENSIVE ANALYSER

Poor Inline Mixing

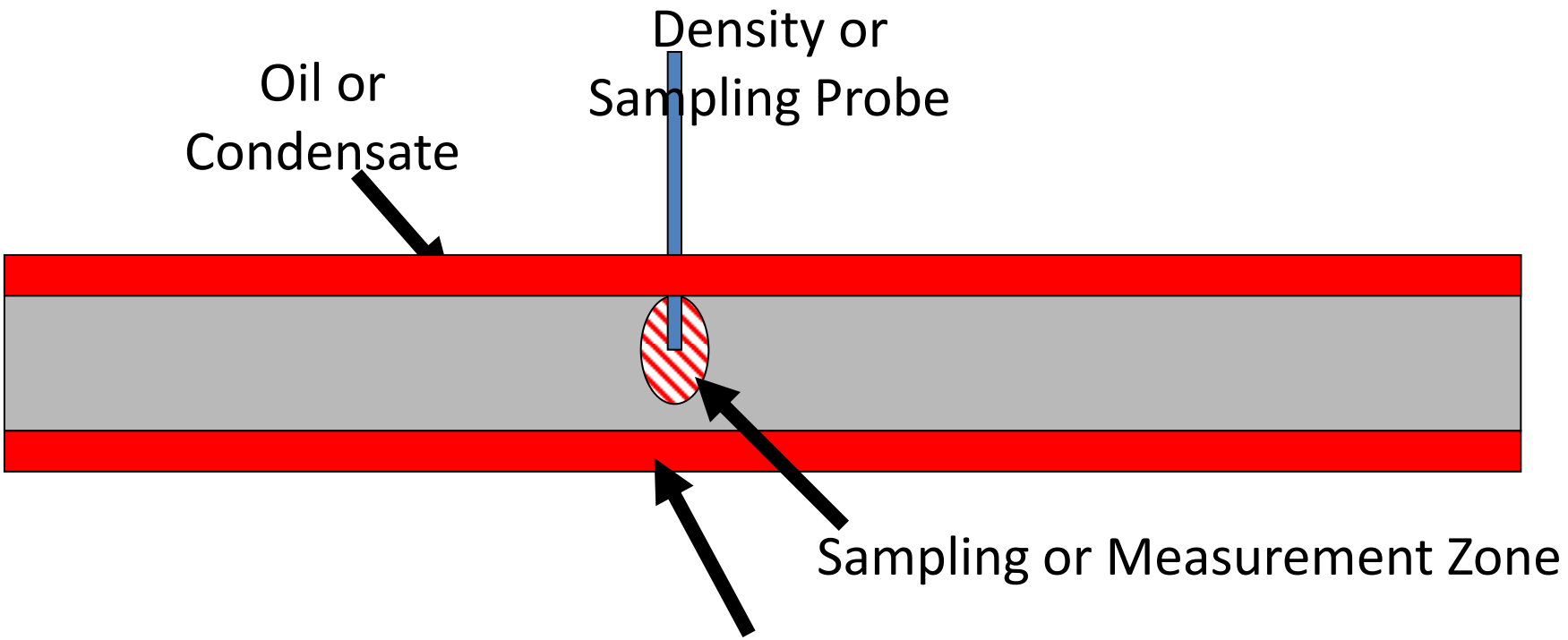


Impact on ARABIAN LIGHT API 34 @ 0.3% Water	
True Gravity	0.8555
Measured Gravity	0.8550
Error	0.359%

Density out by 0.35%!

Measurement Misses all of the water

Poor Inline Mixing Temperature Profile



Higher Viscosity Systems
Laminar Flow
Outside of Pipe different temperature to inside

Viscosity & Temperature not accurate

Poor Mixing Costs

100,000 BOPD

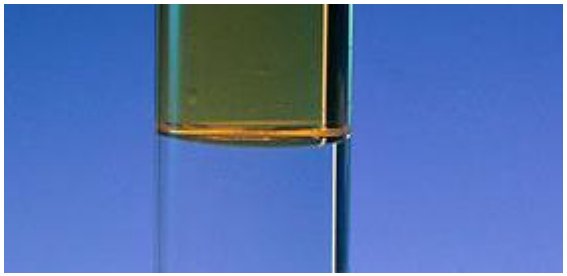
0.1 – 0.3% could be water

4 – 12 M USD per year waste

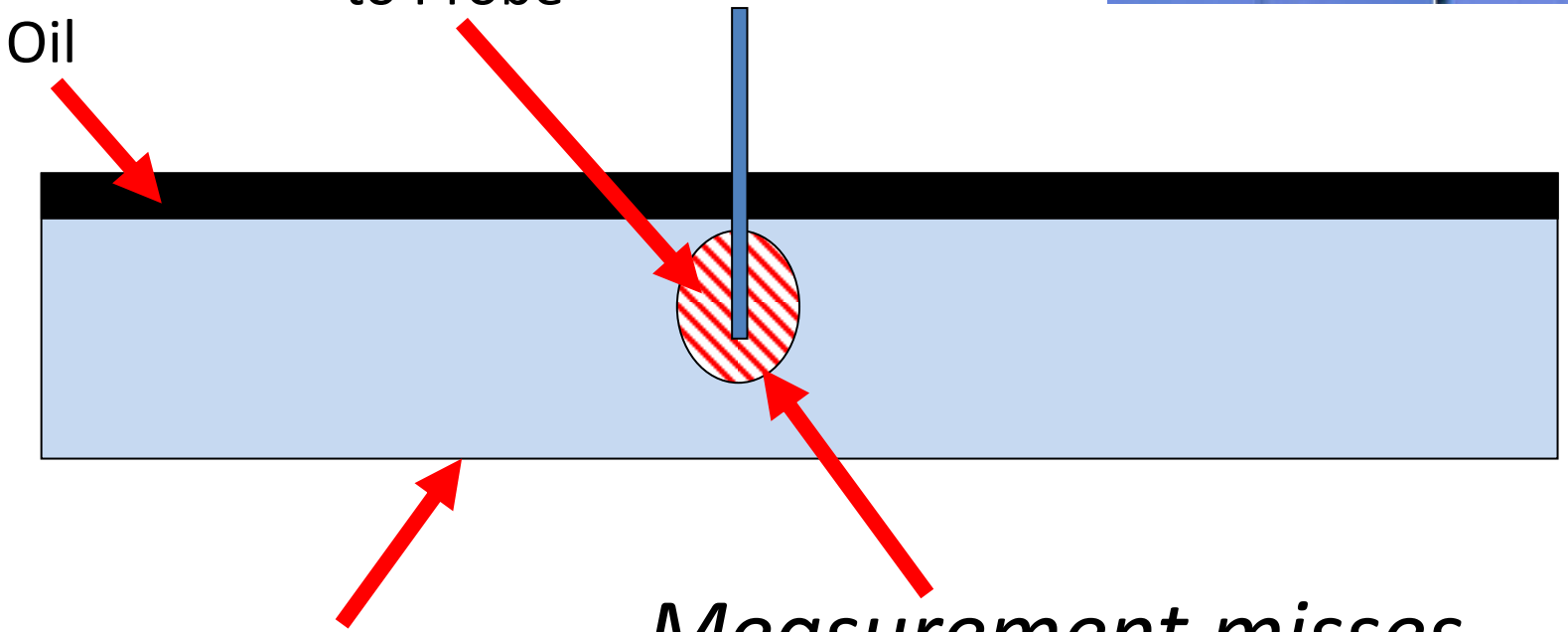
FLUIMIX CAPTURES WATER

to +/- 0.025%

Produced Water Without Mixing



Oil in Water Monitor only measures oil droplets near to Probe



Measurement misses oil droplets

QP - Durkhan – 7 Sampling & Measurement Points

Analyser 60 – 70 ppm

Samples 1 – 2 ppm

Which to believe?

If Either!!!

Measurement Why?

Damages Environment

2010 UK DECC Section 5.2 Requires IS0 3171

Wastes Oil

Damages Reservoirs

FluiMix

Advising DECC on New Guidelines

Analyser Companies Support Mixing

Jorin

ProAnalysis

Turner Hydrocarbon

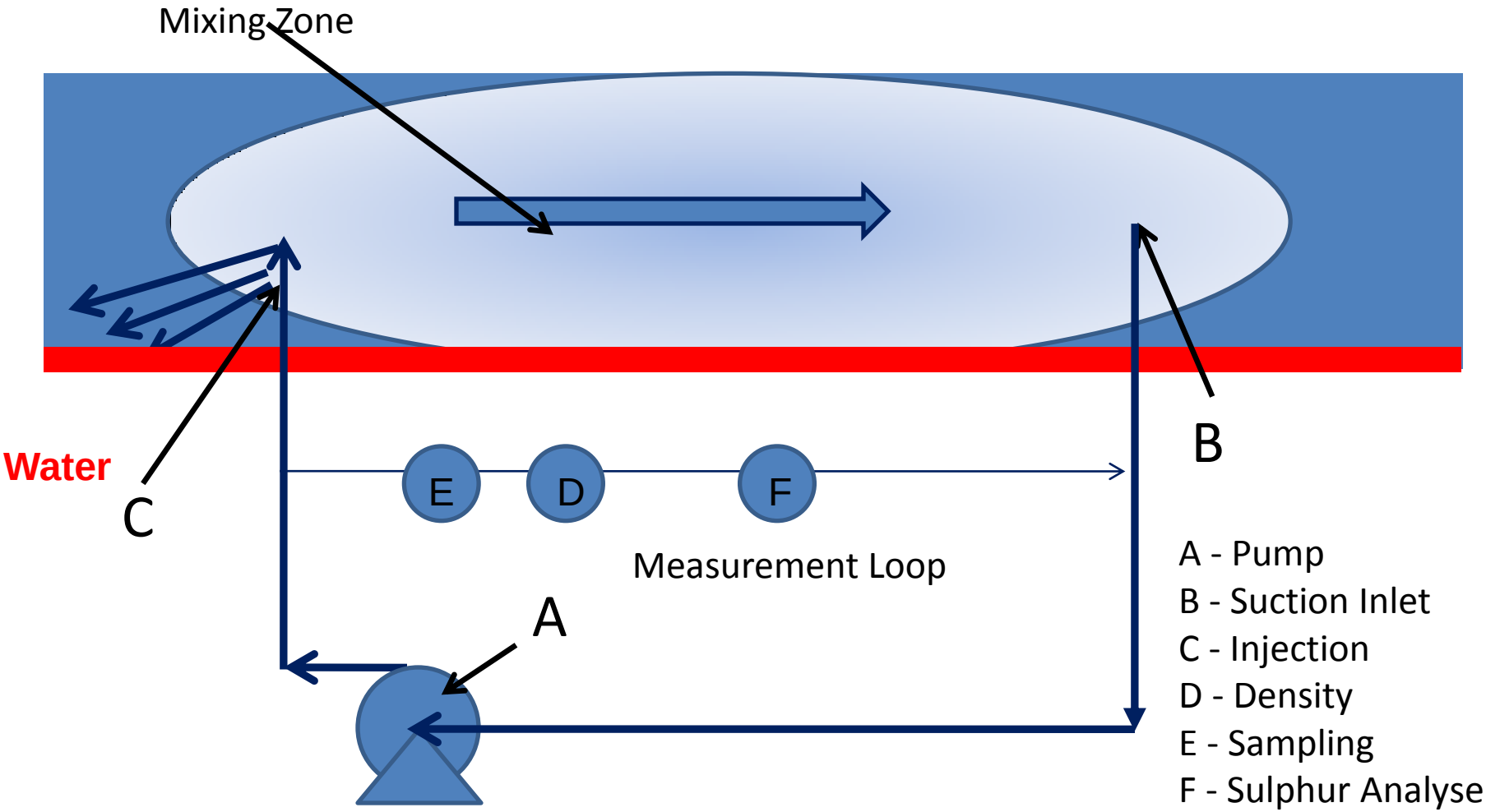
Deckma

FluiMix™

FLUIMIX TECHNOLOGY Mixing

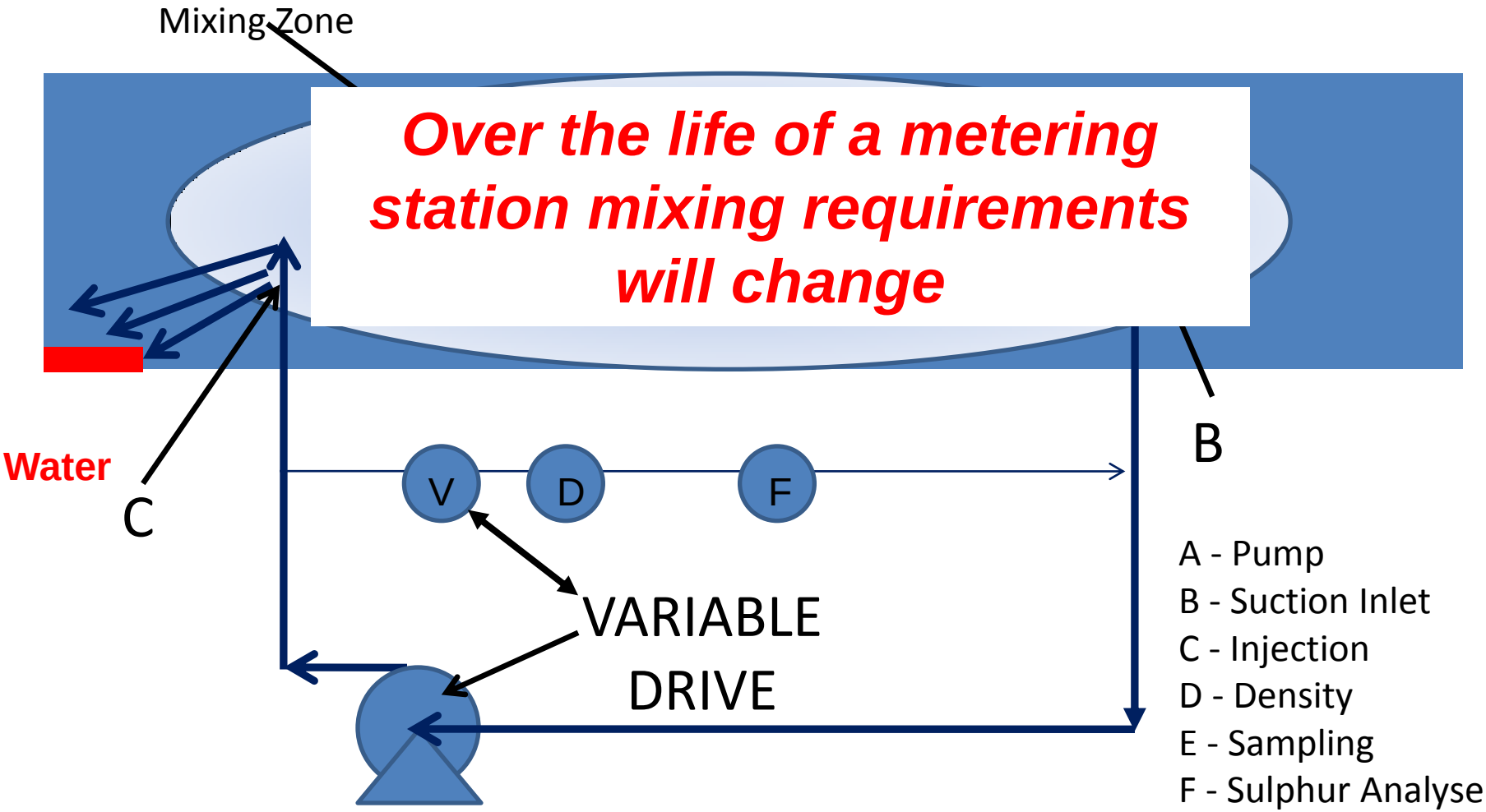
CONTROLLED MIXING WITHOUT TANKS, TIME OR PRESSURE DROP

FluiMix™

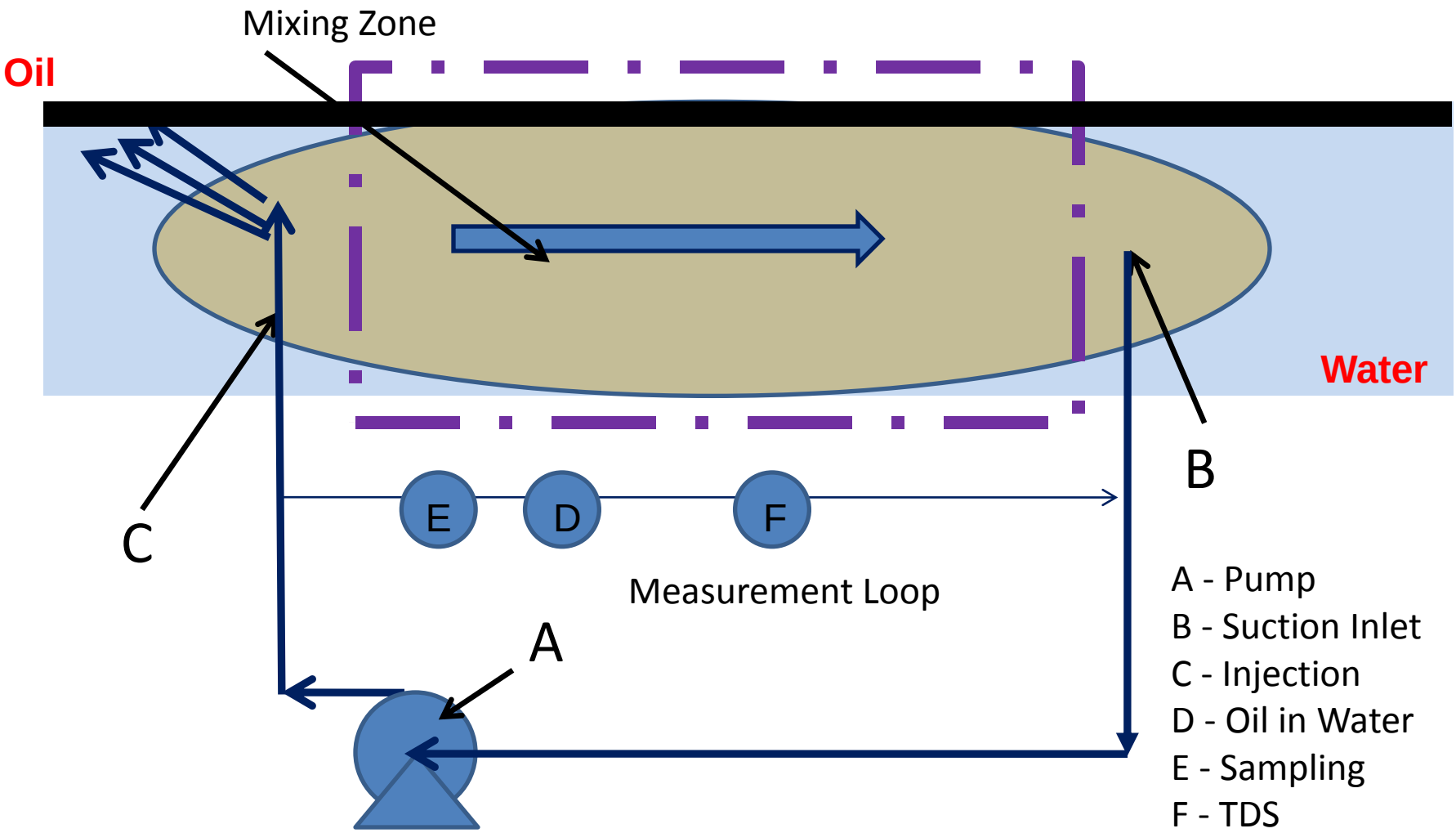


A - Pump
B - Suction Inlet
C - Injection
D - Density
E - Sampling
F - Sulphur Analyser
G - BS& W
H - Salt

FluiMix™ & FluiSave ™



FluiMix™ Produced Water



A - Pump
B - Suction Inlet
C - Injection
D - Oil in Water
E - Sampling
F - TDS
G - Total Oxygen
H - pH

New Analysers

Dissolved Oxygen

TDS

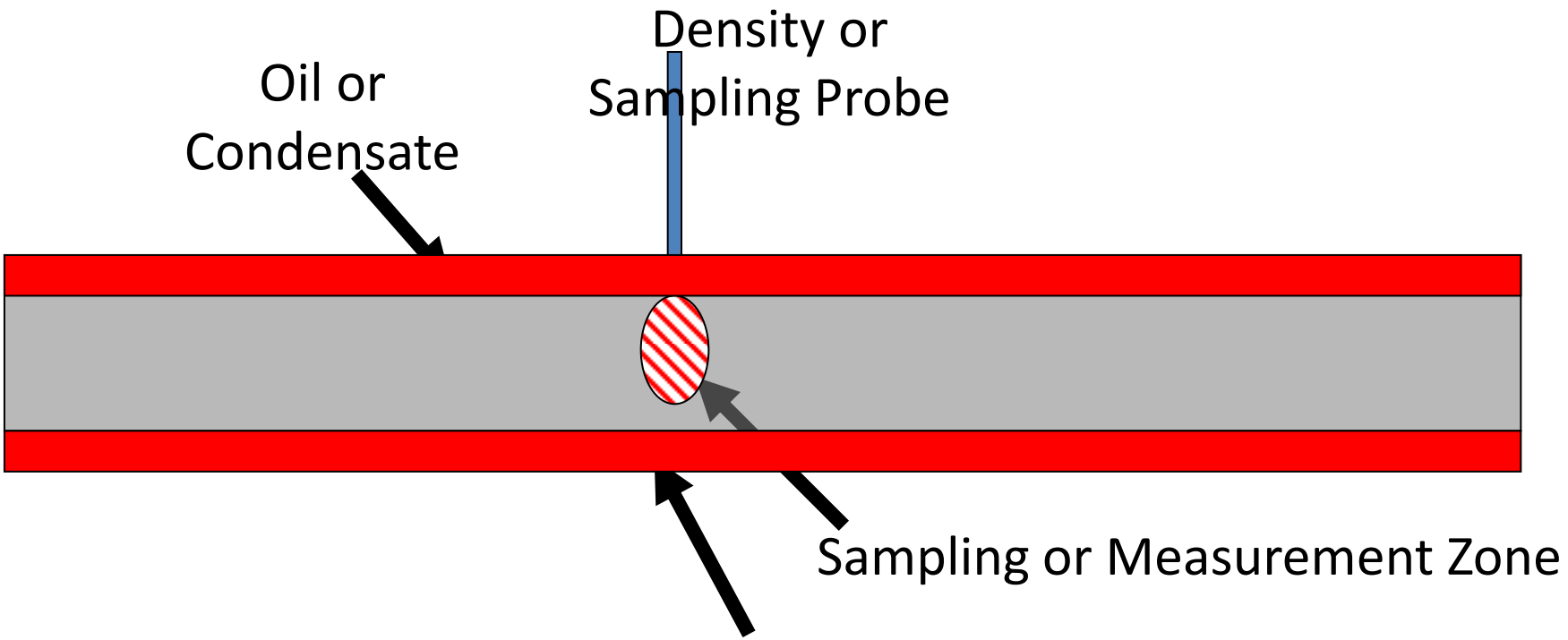
Oil in Water

BTEX

Others Possible

Flow Proportional Sampling

Poor Inline Mixing Temperature Profile

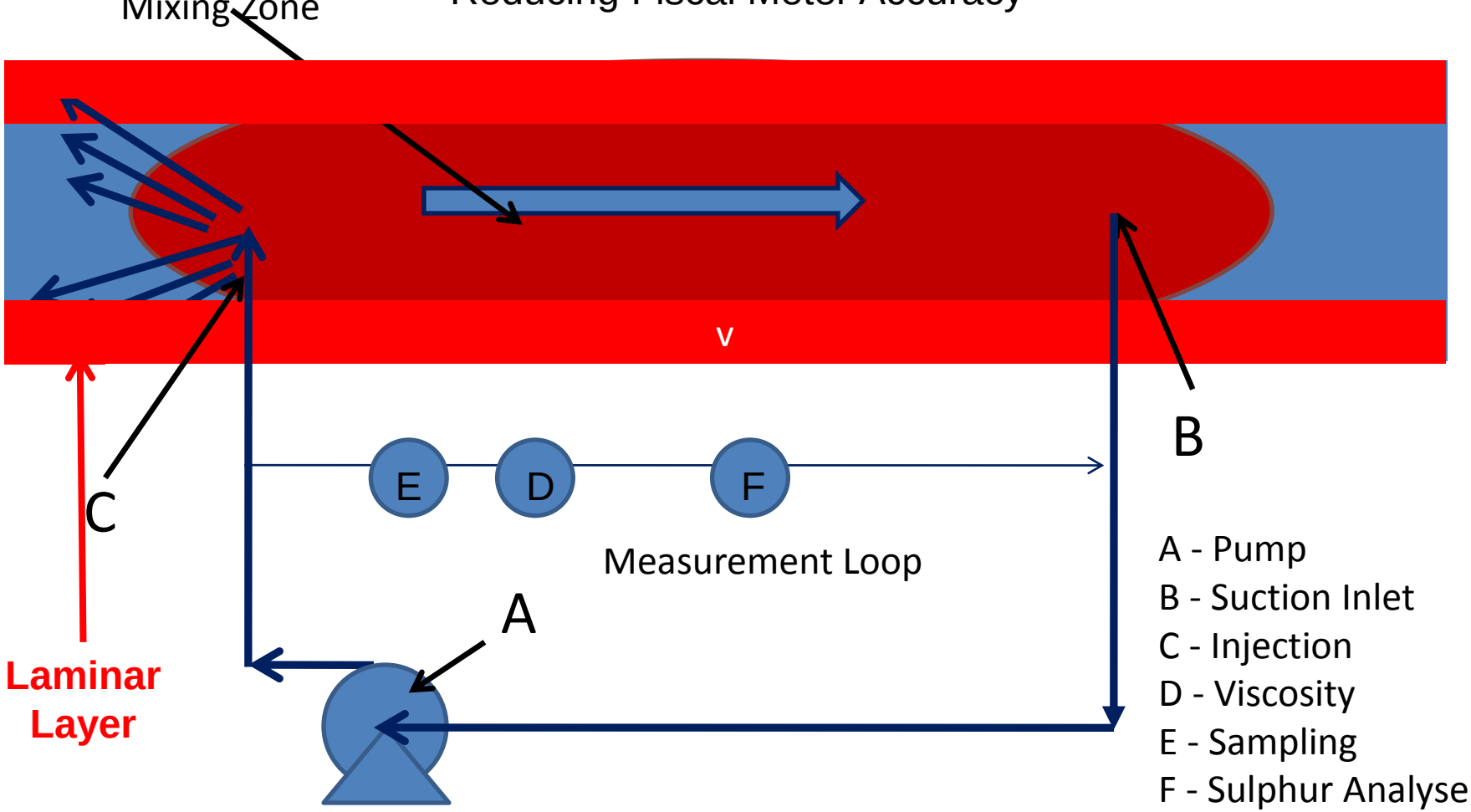


Higher Viscosity Systems
Laminar Flow
Outside of Pipe different temperature to inside

Viscosity & Temperature not accurate

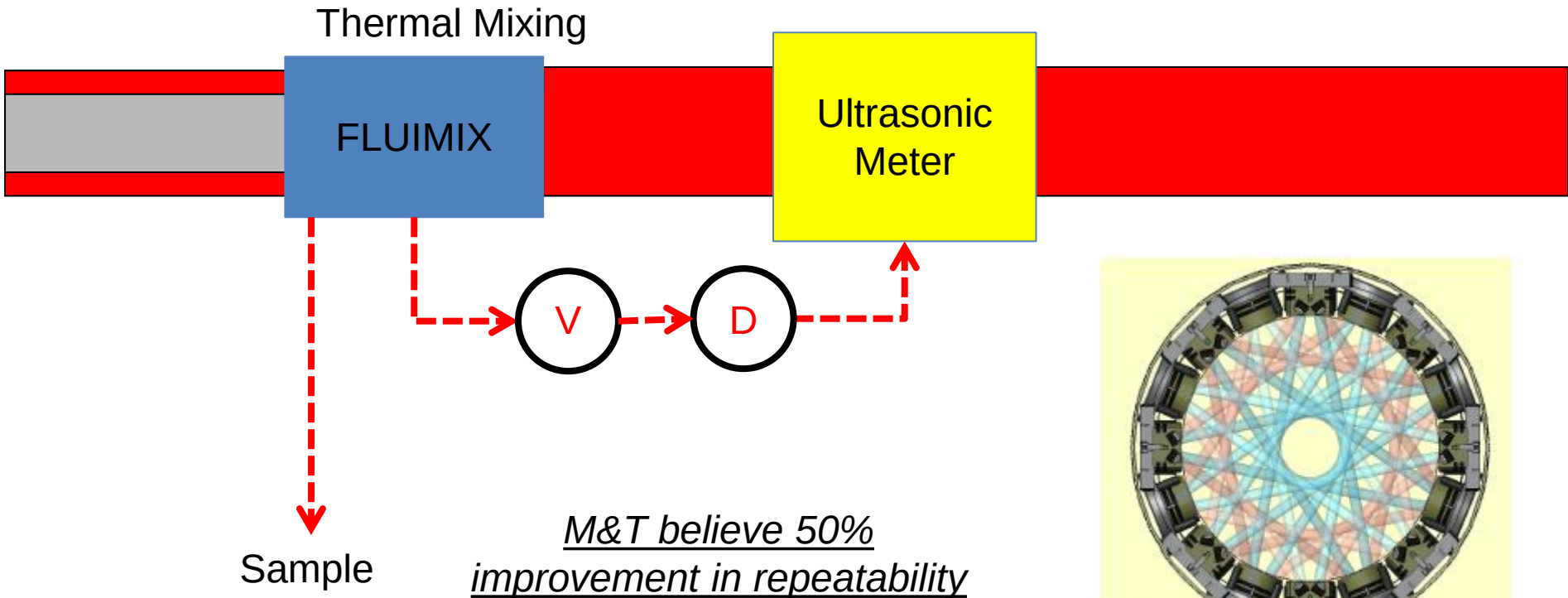
FluiMix™ Temperature Profile

Unmixed Fluid gives temperature gradient across pipe
Reducing Fiscal Meter Accuracy



Measurement
High Viscosity

Range ability of Ultrasonic Meter Improved at Low Flow Rate with Dynamic Flow profiling based on True Reynolds Number



M&T believe 50% improvement in repeatability achievable

FluiMix

- Mixes
  - Any Crude Oil
  - Any Viscosity
  - Any Through Put
  - Zero Pressure Drop

FLUIMIX - IMPROVES MEASUREMENT

FISCAL SAMPLING

DENSITY

BS&W

% SULPHUR

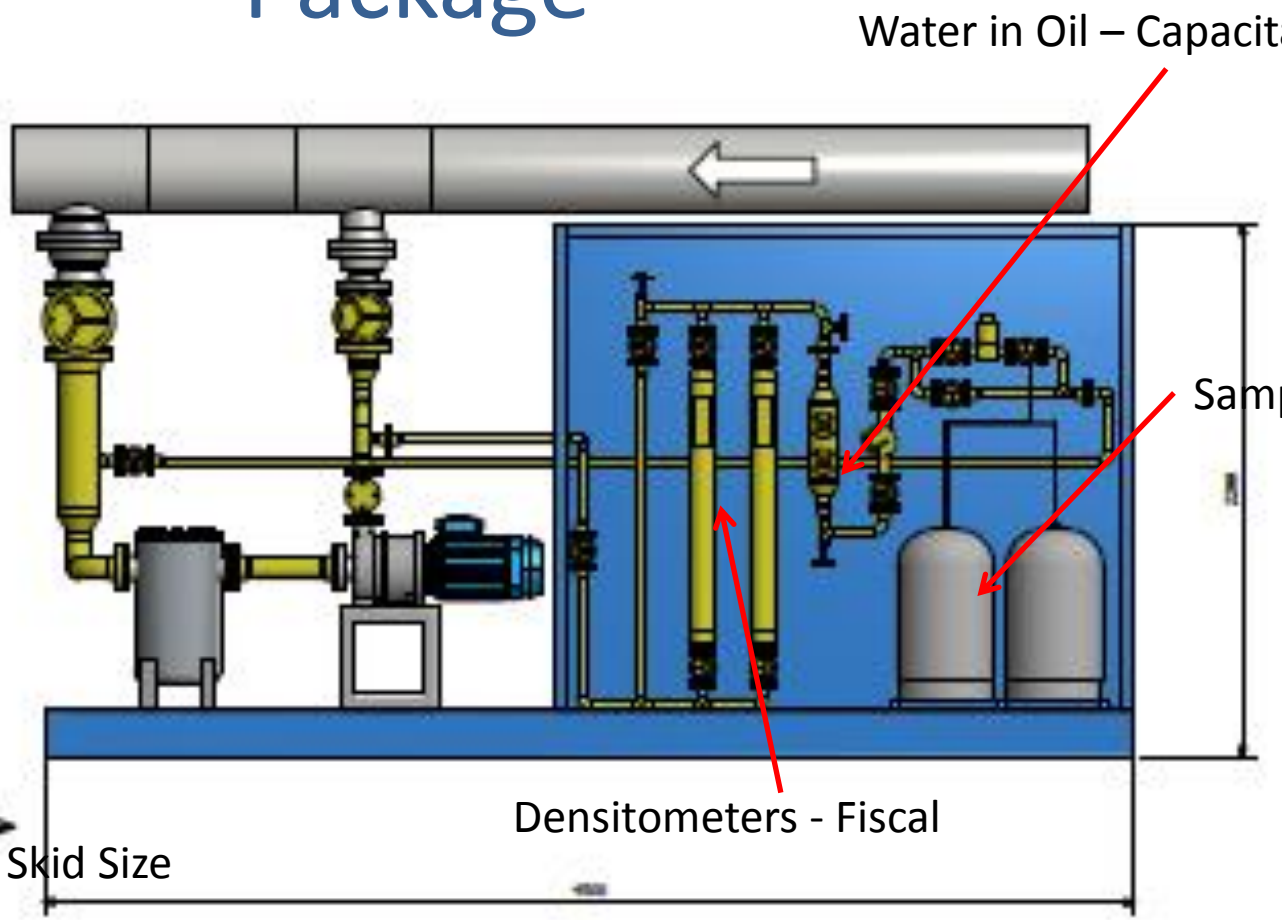
SALT

WATER CUT

Oil in Water

BLENDING

Typical FluiMix Analyser Package



Typical Skid Size
3 x 4 m
2 x 5 m
10,000 kgs
20 – 50 kw

FluiMix Complies to

- API 8.2
- ISO 3171
- ASTM D4177

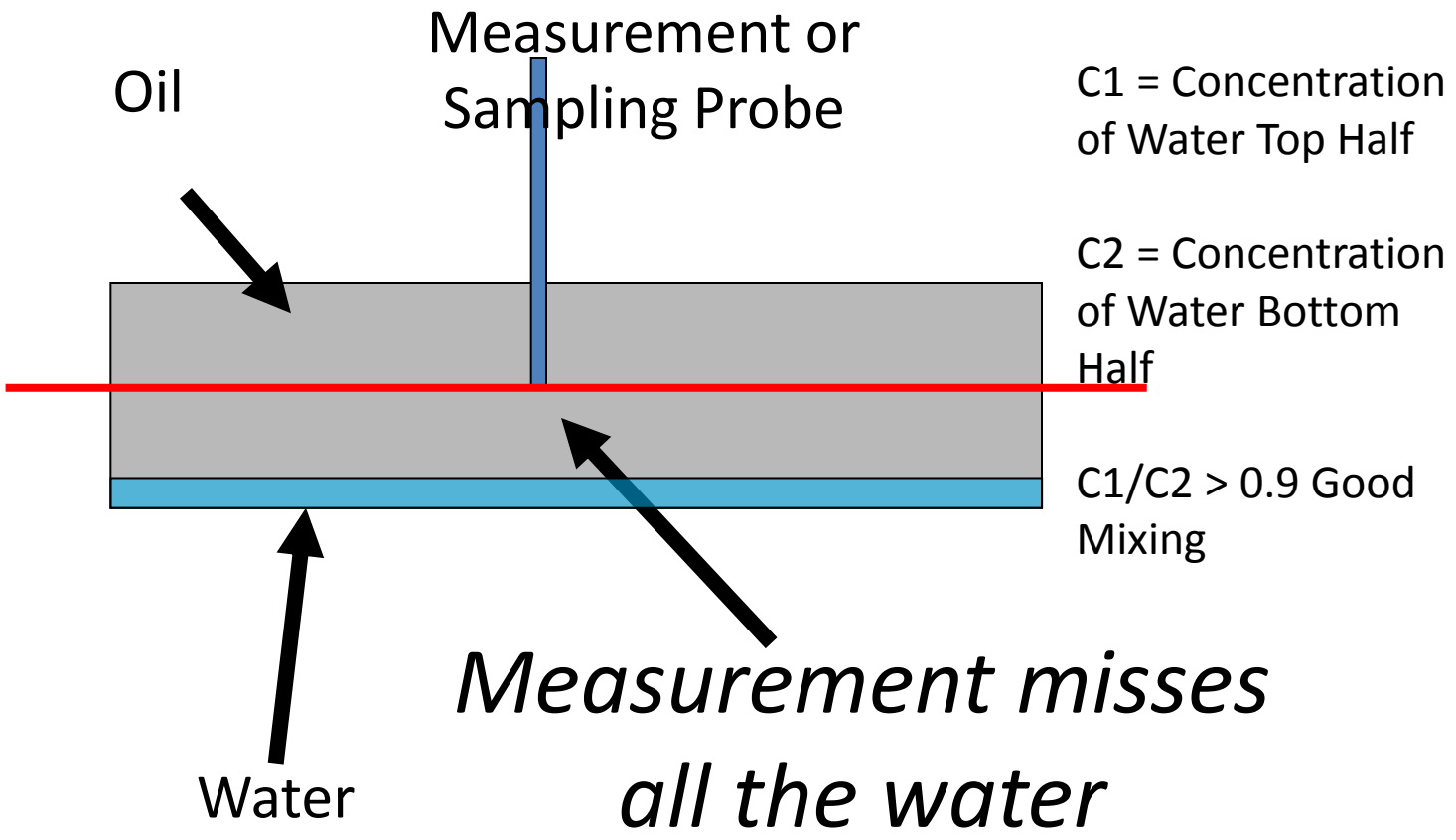
CRUDE AND PRODUCED WATER SAMPLING AND MEASUREMENT STANDARDS

Compliance to API 8, D4177, ISO 3171

1. Homogeneity of pipeline contents
2. Extraction of a flow proportional and representative sample
3. Correct sample handling and mixing
4. Laboratory analysis
5. Proving the overall system

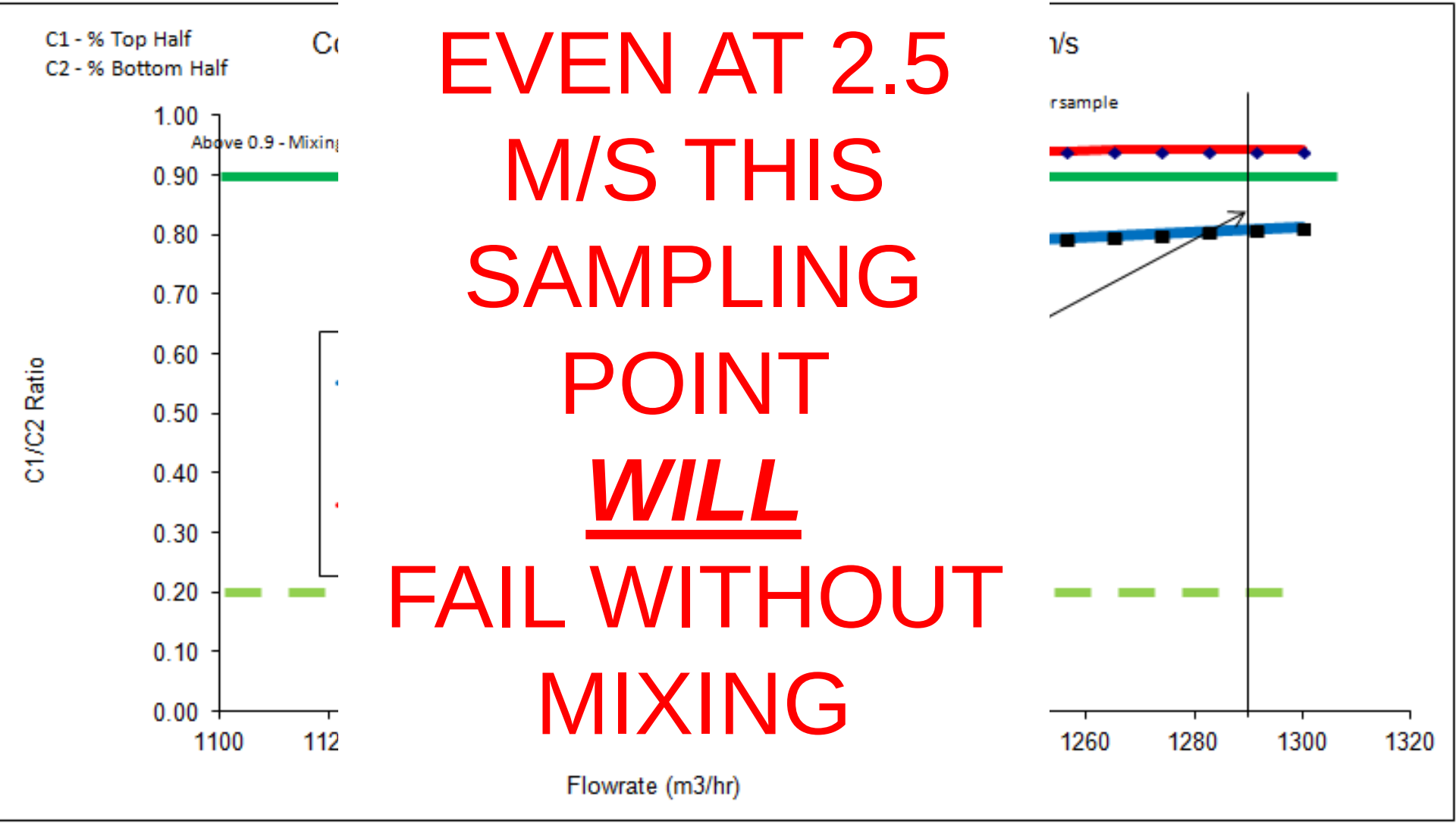
All of the above is required if complaince is required

API 8.2, ISO 3171 & D4177 Standards



FLUIMIX SYSTEMS ARE GUARANTUEED TO COMPLY

Step 1 - Is there enough Mixing



EVEN AT 2.5 M/S THIS SAMPLING POINT ***WILL*** FAIL WITHOUT MIXING

Conclusion

MIXING WILL BE REQUIRED FOR COMPLIANCE

ALL Density Measurements

FLUIMIX MIXING SYSTEMS WILL SOLVE COMPLIANCE