FineTek

EPD/EPR Flowmeter & Wastewater Treatment Process

- **Electromagnetic Flowmeter (EPD)**
- **Paddle Wheel Flowmeter (EPR)**

Jarvis Wu (Eng.)

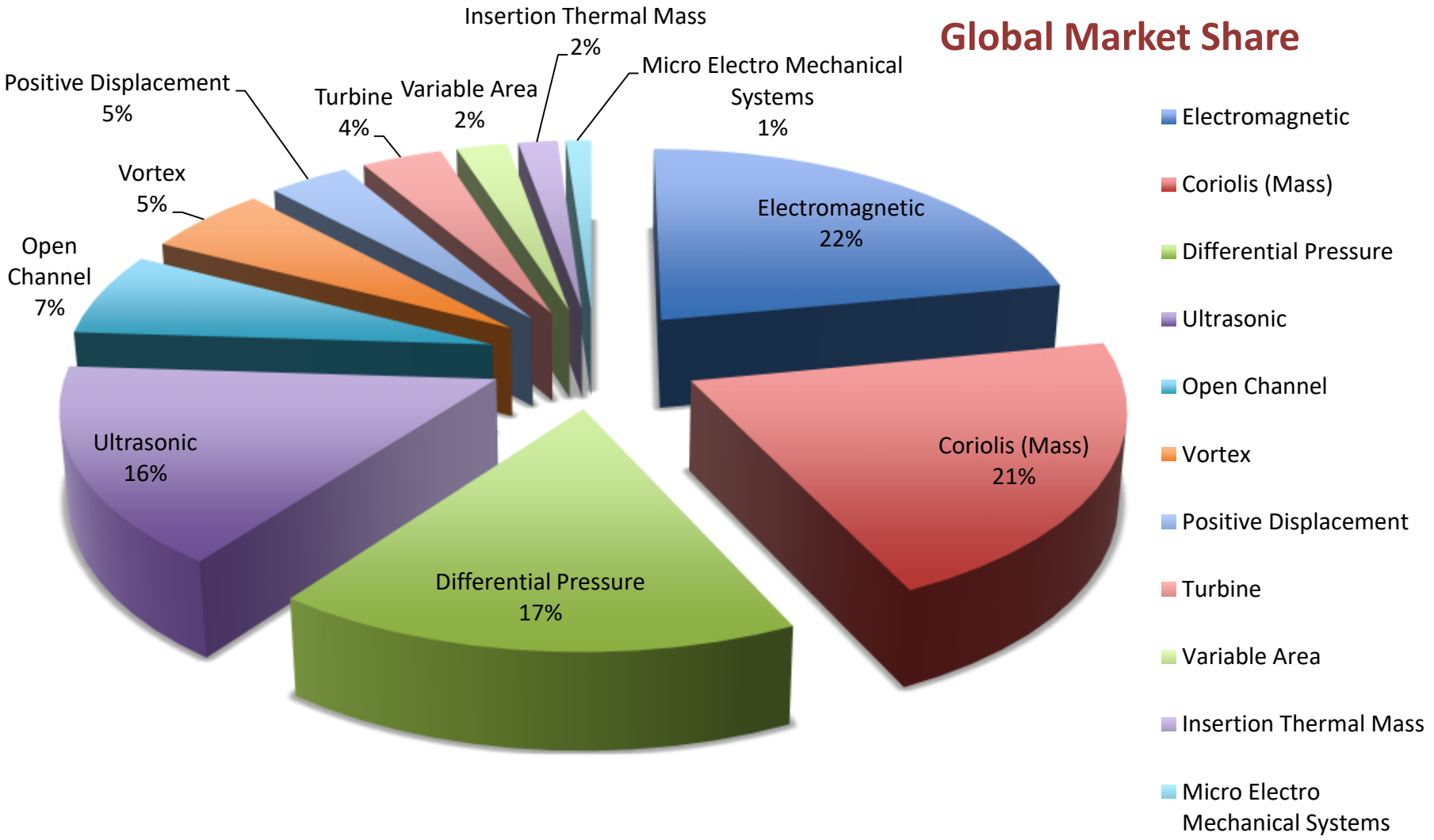
(Marketing Dept.)

OIML ilac-MRA TAF Testing Laboratory 3086 CE

Outline

- Flowmeter Market Overview
- Electromagnetic Flow Meter (EPD)
  - Working Principle
  - Product Features & Specification
  - OIML R.49
  - Water Flow Lab (ISO 17025, ILAC, TAF)
  - Installation Tips
  - Selection Tips
  - Case Study
- Paddle Wheel Flow Meter (EPR)
- Waste Water Treatment (WWT) Process

Flowmeter Market Overview

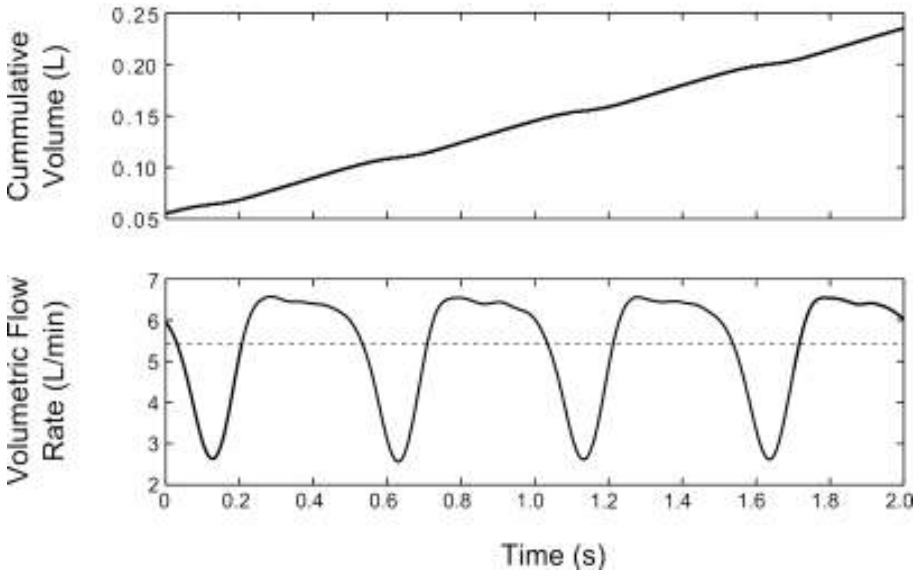


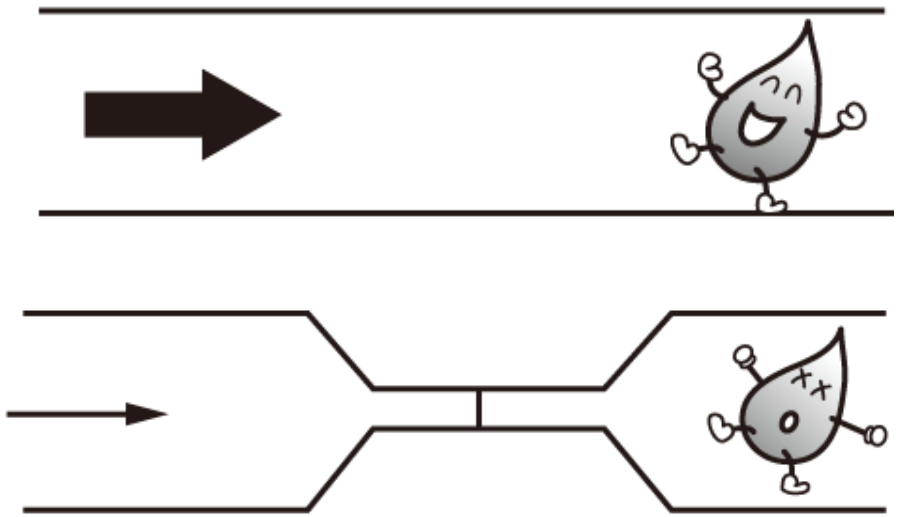
Flow Meter for Liquid, Gas, Steam, Slurry

	Liquid	Gas	Steam	Slurry
Coriolis/Mass	Y	Y		Y
Electromagnetic	Y			Y
Differential Pressure	Y	Y	Y	Y
Ultrasonic	Y	Y		
Vortex/Oscillatory	Y	Y	Y	
Positive Displacement	Y	Y		
Turbine	Y	Y	Y	
Variable Area	Y	Y	Y	
Thermal	Y	Y		

FAQ from Clients

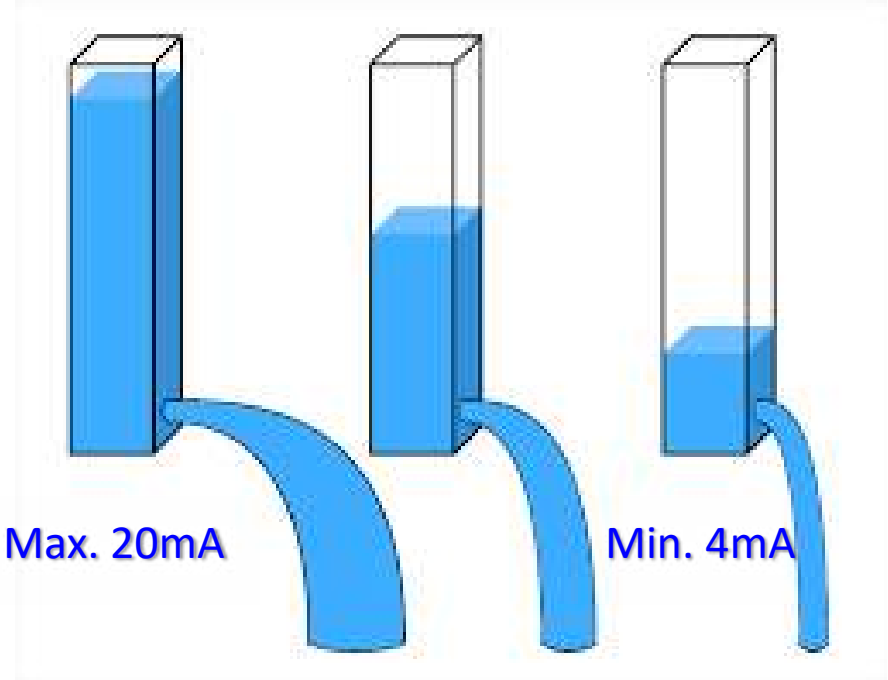
- Instantaneous Flow & Cumulative Flow
- Pressure Drop





Instantaneous Flow & Cumulative Flow

Instantaneous Flow
(4~20mA Analog Signal)



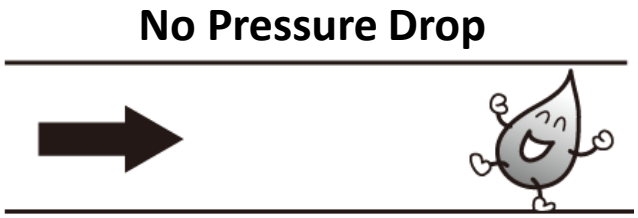
Flow Unit: **(Liter, m^3)/(min, h)**

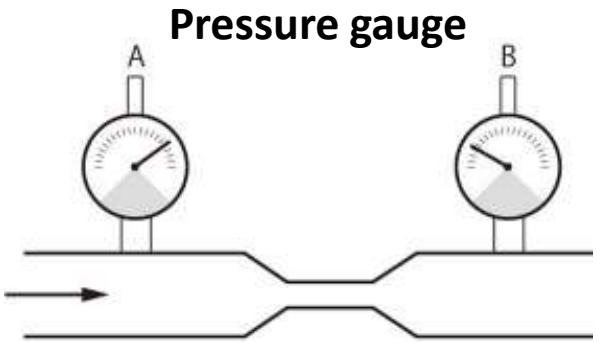
Cumulative Flow
(Pulse Frequency Signal)

Flow Unit: **Liter, m^3**

Factors of Pressure Drop

1. Reducer
2. Elbow, Bend, T-fitting or joints.
3. Valve
4. Flowmeter



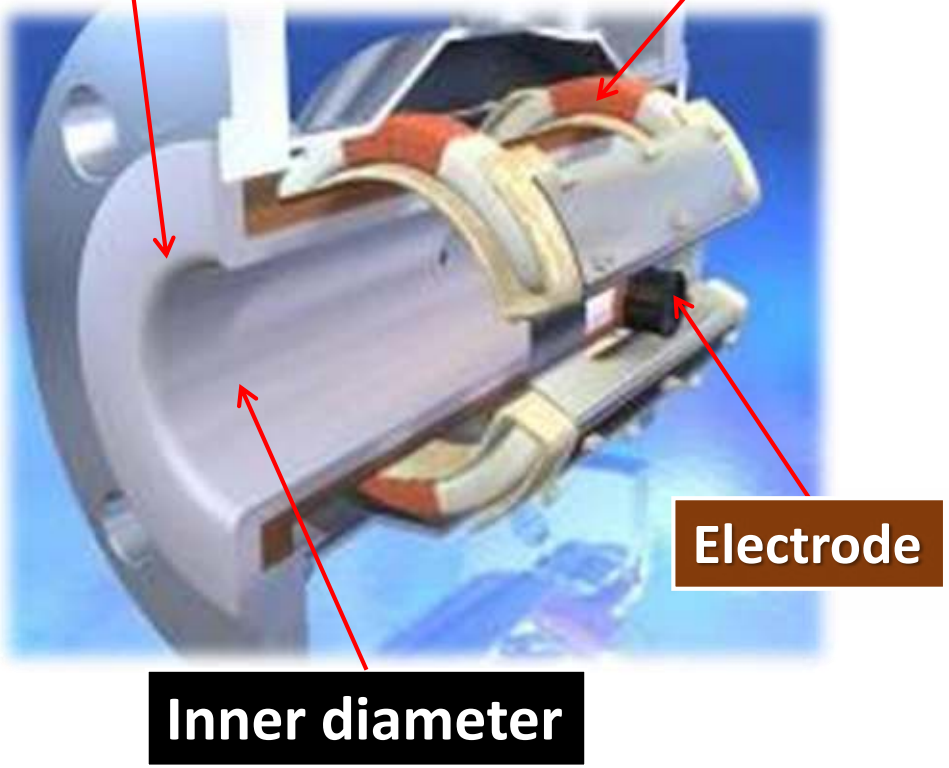


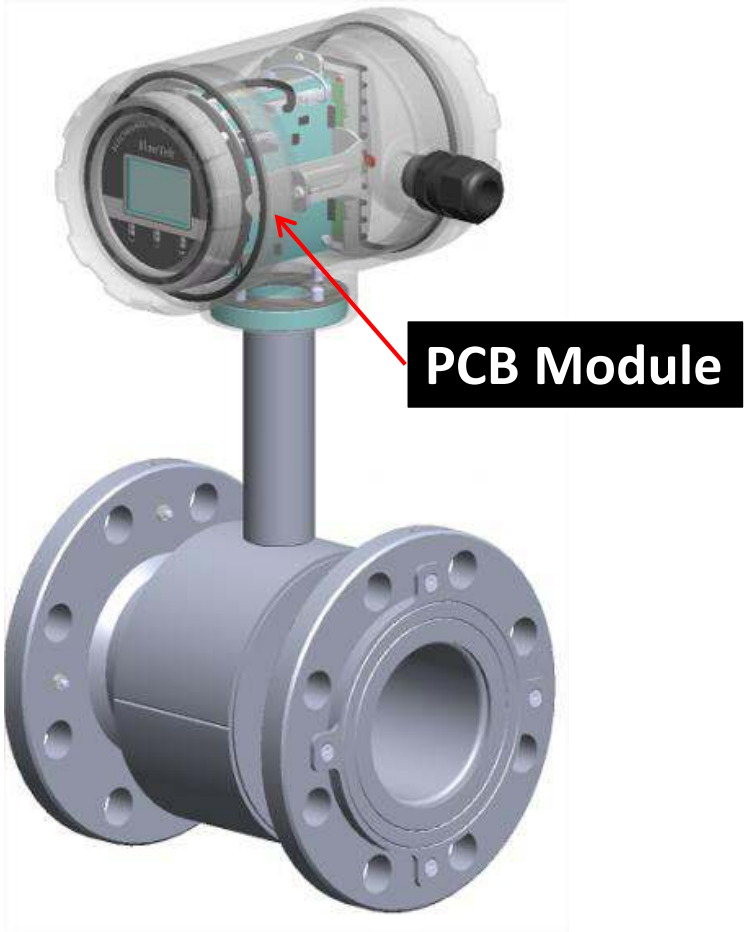
Increasing Pipe Capacity

Increasing Pump Capacity

Electromagnetic Flow Meter：EPD

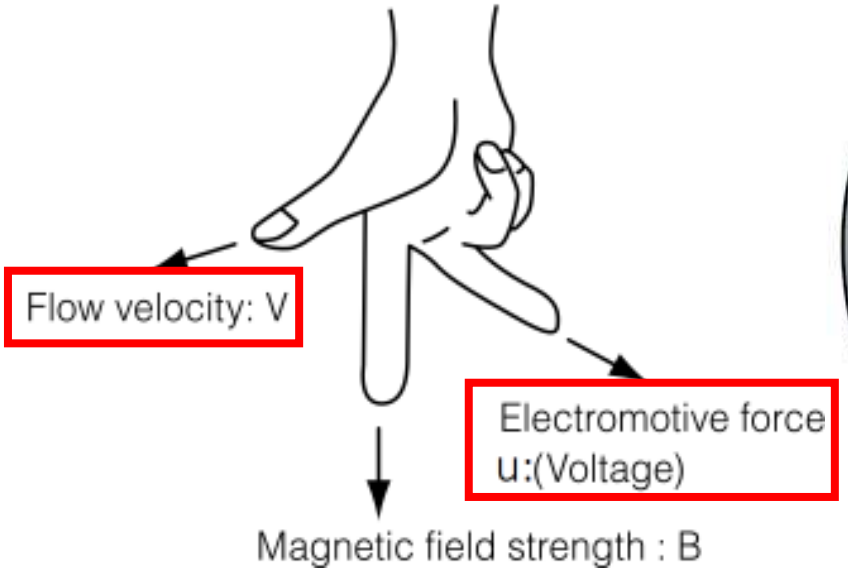
EPD Structure

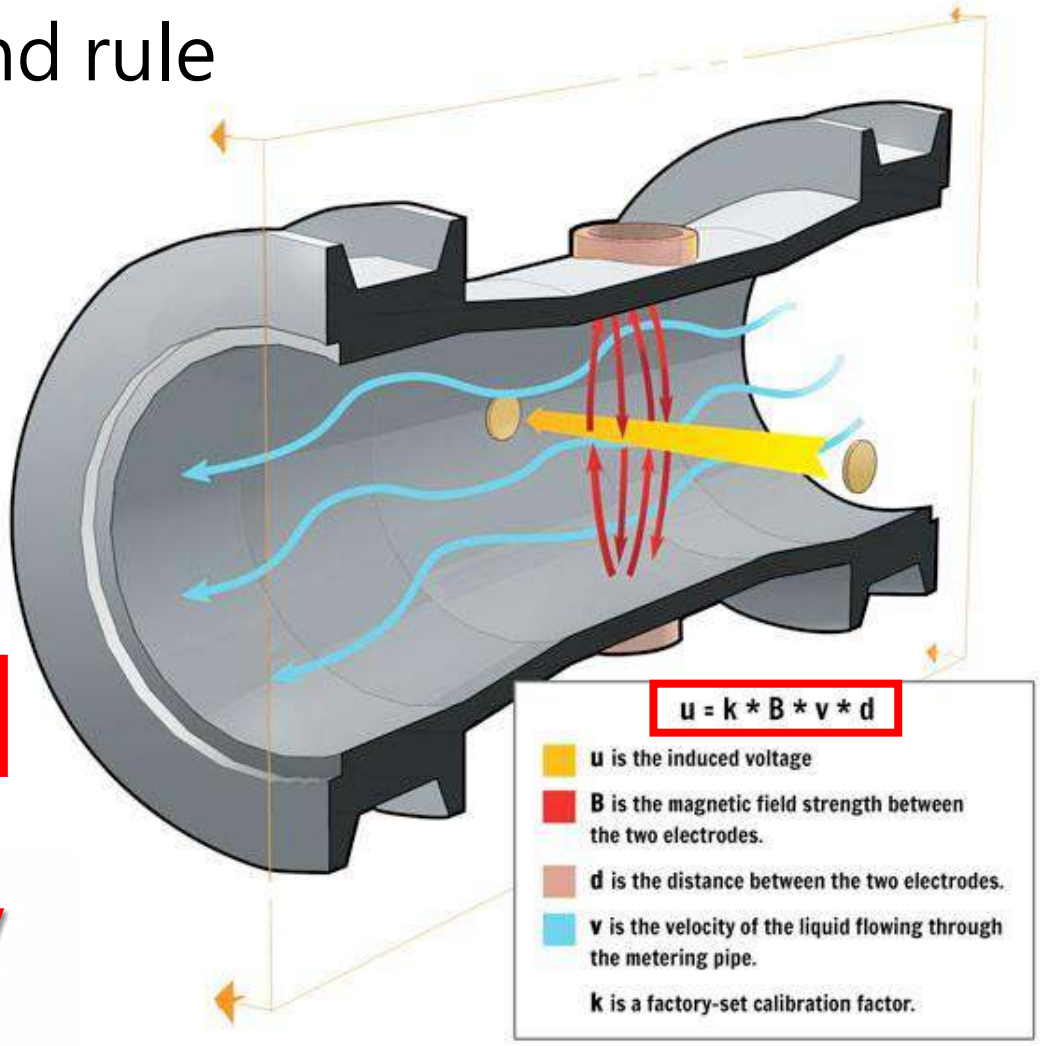




EPD Working Principle

Faraday Law: right-hand rule

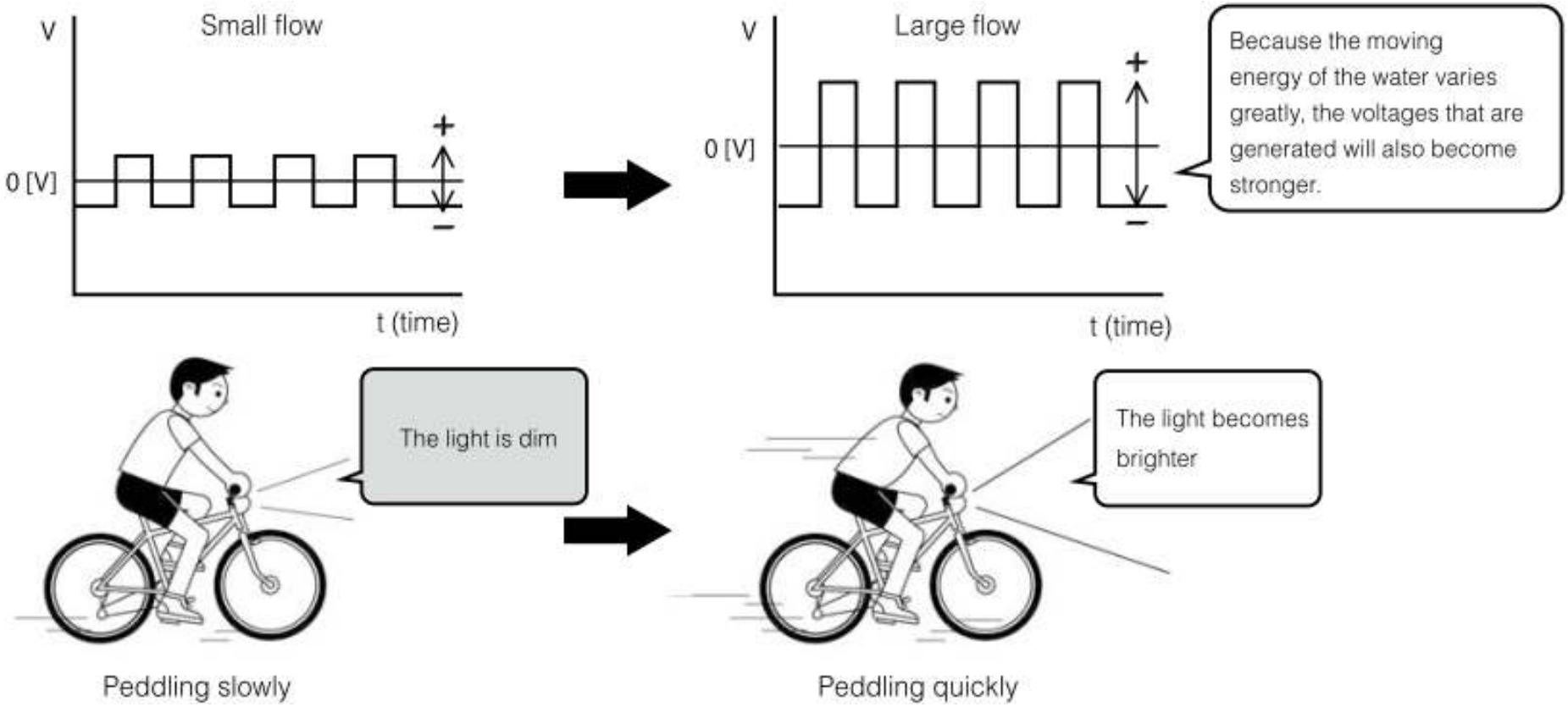




u is proportional to V

Flow velocity vs. Electromotive Force

As the **flow velocity** changes, the **electromotive force (voltage)** captured by the electrodes changes as follows.



EPD Features

- Any Conductive Liquid > 5 uS/cm
- Excellent Linearity of Measurement
- Measuring Range => 1：100 (0.1m/s ~ 10m/s)
- NOT affected by Temperature, Pressure, Density or Viscosity
- NO Mechanical Moving Part.
- NO Pressure Drop
- Smart Self-Diagnosis：PCB Error, Electrode Dirty (Coating Non-Conductivity), Electromagnetic Coil Fail…
- Various Alarm：No Flow, Over Flow Range, System Error …
- Vibration Regulation：IEC 60068-2-3
- EMC Regulation：IEC/EN 61326-1 Class A table 2

Voltage dip, Short interruptions, Burst, Surge, Interference…

EPD Specification

1. Accuracy：±0.5% (± 0.2% optional)
2. Diameter：DN40~DN300 (Food Grade：DN15~DN50)
3. Medium Temperature：-20~120℃
4. Measuring range：0.1m/s ~ 10 m/s
5. Fluidic conductivity > 5 uS/cm
6. Protection rating：IP67 / NEMA 4X (IP68 optional)
7. Output：Analogy 4~20mA Signal, Frequency Pulse Signal
8. Communication interface：RS-485
9. Available for Remote, Food Grade, & Battery Power types

*** For any Conductive Liquid > 5 uS/cm ***

OIML R49/2013

OIML Organisation Internationale de Métrologie Légale
International Organization of Legal Metrology

FineTek

LNE
Le progrès, une passion à partager

cofrac
CERTIFICATION DE PRODUITS ET SERVICES
Accréditation n°5-0012
Liste des sites accrédités et portée disponible sur www.cofrac.fr
CIM15-V8-05-2013

Etat Membre de l'OIML
Member State of OIML
FRANCE

CERTIFICAT OIML DE CONFORMITE
OIML CERTIFICATE OF CONFORMITY

N° R49/2013-FR2-17.01

Autorité de délivrance *Issuing authority*	: Laboratoire National de Métrologie et d'Essais Personne responsable (Person responsible) : Thomas LOMMATZSCH
Demandeur *Applicant*	: FINETEK CO LTD - No.16, Tzuchiang St., Tucheng Industrial TAIWAN, PROVINCE OF CHINA 236 NEW TAIPEI CITY
Fabricant *Manufacturer*	:
Identification du type certifié	: compteur d'eau électromagnétique FINETEK type EPD3X
Identification of the certified pattern	*electromagnetic water meter FINETEK type EPD3X*
Caractéristiques *Characteristics*	: voir annexe *see annex*

Ce certificat atteste la conformité du modèle mentionné ci-dessus (représenté par les échantillons identifiés dans les rapports d'essais associés) aux exigences de la Recommandation suivante de l'Organisation Internationale de Métrologie Légale – OIML) :

This certificate attests the conformity of the above-mentioned pattern (represented by the samples identified in the associated test reports with the requirements of the following Recommendation of the International Organization of Legal Metrology – OIML) :

R49/2013

What is OIML & OIML R49?

- **OIML (International Organization of Legal Metrology) is Organisation Internationale de Métrologie Légale (French).**
- **an intergovernmental organization was created in 1955 to promote the global harmonization of the legal metrology procedures (Headquarters：Paris, France)**

  => creating **global standards** for use in **legal metrology legislation**.

Ps. As of July 2019 a total of 61 states are Member States and 61 are Corresponding Members.

- **OIML R49/2013 Water meters for cold potable water & hot water.**
  - R49 Part 1：Metrological and technical requirements
  - **R49 Part 2：Test methods**
  - R49 Part 3：Test report format

EPD3X apply Accuracy Class II, Testing Result：Accuracy Class I (resolution error：Class II ≤ 0.5%, Class I ≤ 0.25%)

OIML R49 – Part II：Test methods

7.4 Determination of Intrinsic Errors (Reading)

7.10 Flow Disturbance Test (Swirl Generator- left, right)

7.5 Water Temp. Test 20 ~35 ℃

7.6 Overload Temp. 60 ℃

7.11 Durability Test 800~1000Hrs (No stop 33days ~ 41 days)

7.9 Pressure Lose Test

8.6 Vibration (Random)

8.7 Mechanical Shock

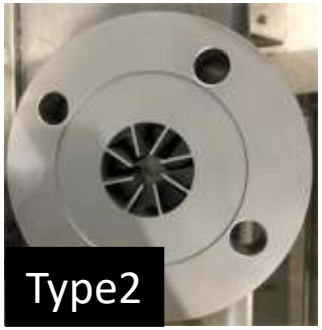
8.4 Damp Heat, Cyclic (Condensing)，25~55 ℃

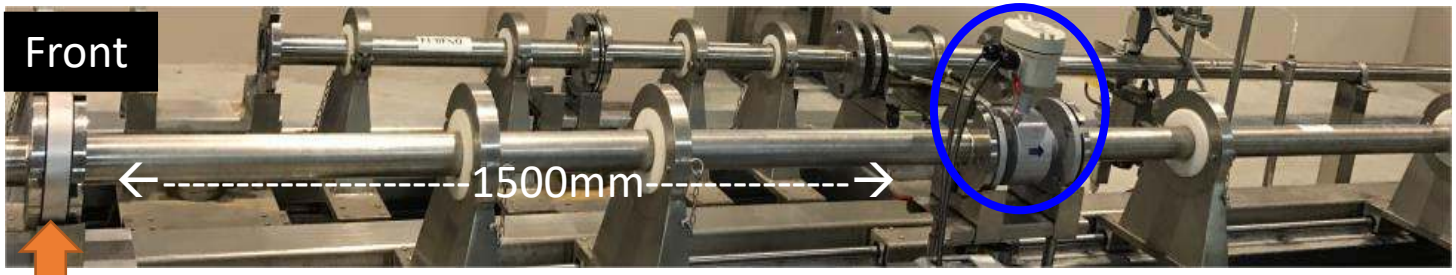
8.16 Static Magnetic Field

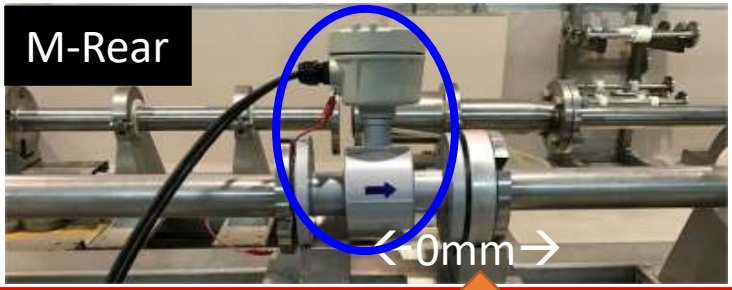
OIML R49 – 7.10 Flow Disturbance Tests

Testing condition：
Swirl Generator Flange

Resolution error：
Class I ≤ 0.25%







FineTek Water Flow Lab (TAF 3086)

Flow Calibration: ISO 17025
ILAC (International Laboratory Accreditation Cooperation)
TAF 3086 (Taiwan Accreditation Foundation)

Accuracy vs. Precision

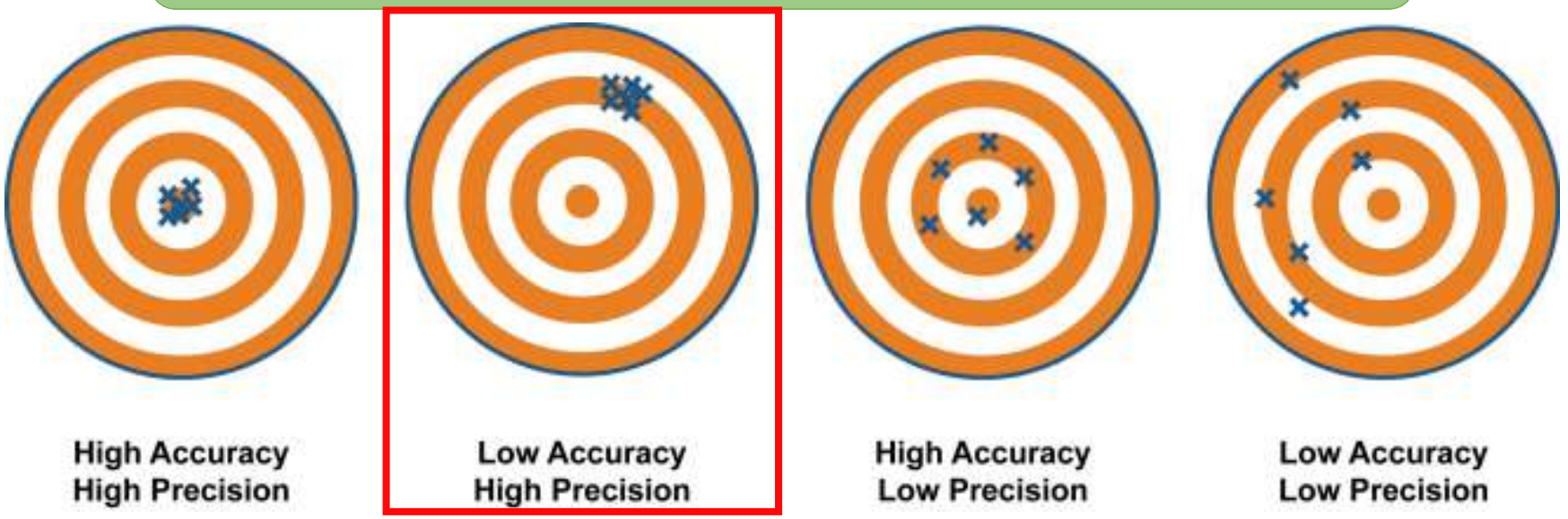
Accuracy:

How close to the "**true value**"

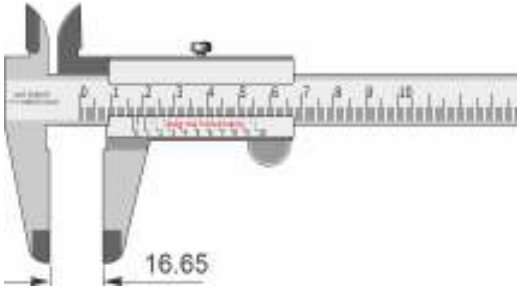
Precision:

How close "**together**" the measurements are to one another !

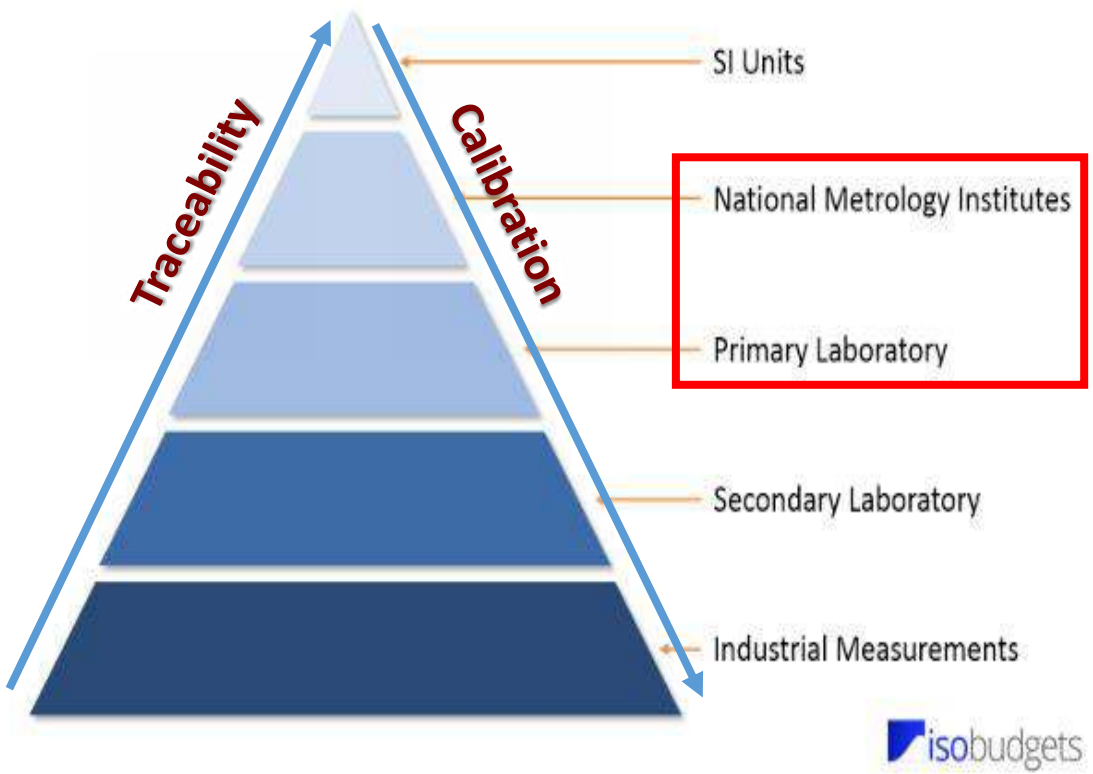
System Uncertainty & Traceability

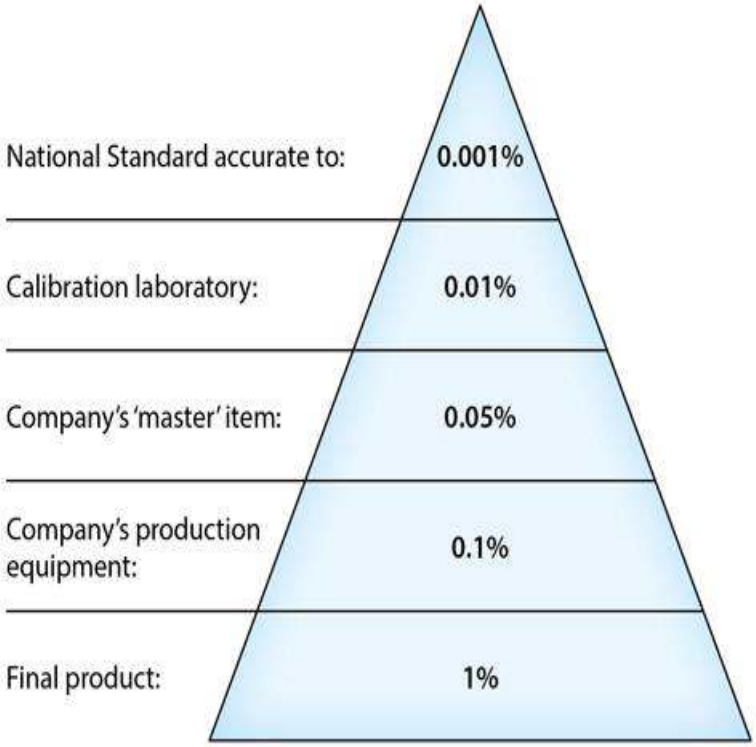


ISO 17025 iLAC (TAF) – Traceability & Calibration



Measurement Traceability Pyramid

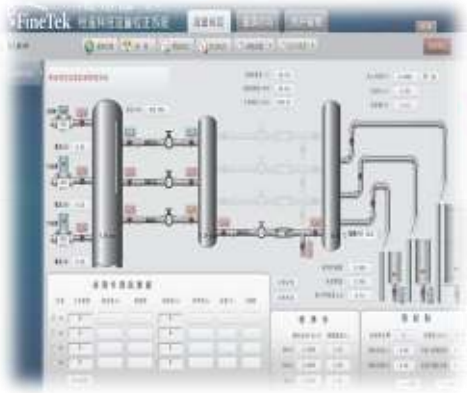




Water Flow Testing/Calibration Lab

Water flow Testing/Calibration System

- **Method：Gravimetric + Master Meter**
- Flow range：0.1 ~ 10 m/s
- Diameter：DN20~DN300 (Max. DN500)
- Max. flow：1680 m3/h
- **System Uncertainty： 0.05%**



GRUNDFOS

SIEMENS KOSO

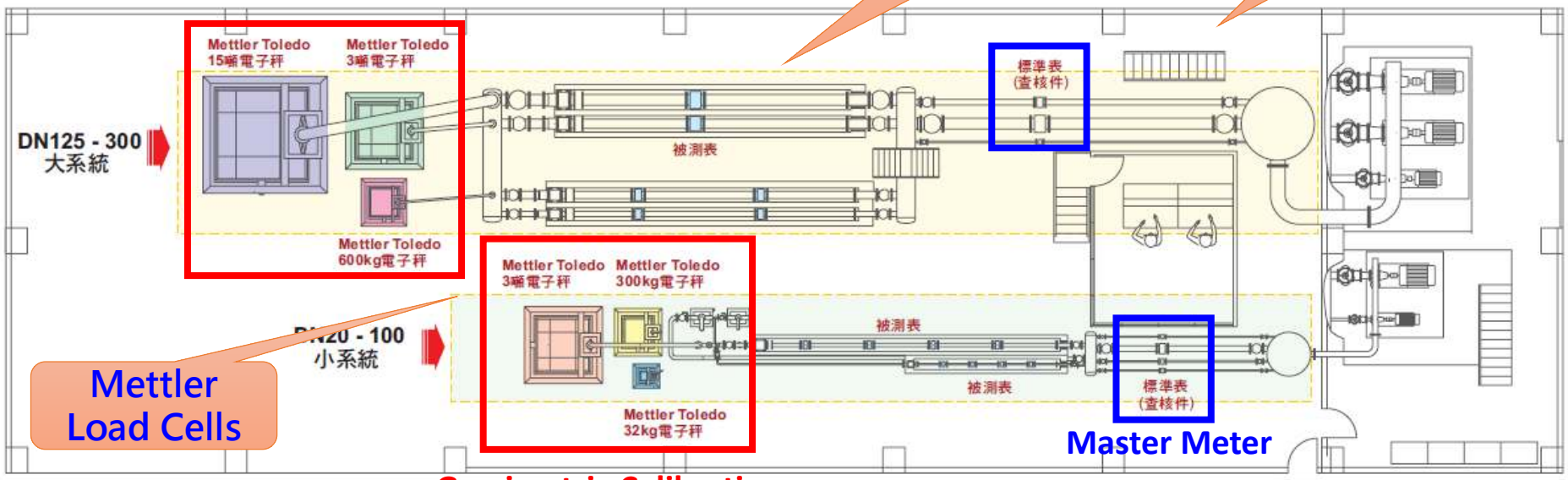
METTLER TOLEDO

Water Flow Testing/Calibration Lab

Water Flow Testing/Calibration System - Floor plan

Inlet 15D, Outlet 8D

Uncertainty 0.05%



Mettler Load Cells

Master Meter

Gravimetric Calibration

Mettler Toledo 3噸電子秤	
Max. Load (kg)	3000
Readability (HR) / Verification Scale Interval (g)	50
Accuracy Class	II
Repeatability (g)	50
Linearity (± g)	±100
Max. Overload Capacity(Central load)(kg)	4500
Preload (kg)	1270

Mettler Toledo 600kg電子秤	
Max. Load (kg)	600
Readability (HR) / Verification Scale Interval (g)	10
Accuracy Class	III
Repeatability (g)	5
Linearity (± g)	±10
Max. Overload Capacity(Central load)(kg)	1000
Preload (kg)	255

Mettler Toledo 32kg電子秤	
Max. Load (kg)	32
Readability (HR) / Verification Scale Interval (g)	0.1
Accuracy Class	II
Repeatability (g)	0.1
Linearity (± g)	±0.2
Max. Overload Capacity(Central load)(kg)	50
Preload (kg)	3

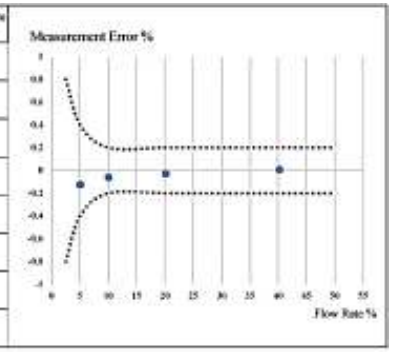
Flow Meter Testing Report (Standard)

(Master Meter Testing Report)

Testing Report

- Order Info
- Testing Conditions
- Accuracy
- Function Testing

SET Flow Rate (%)	Flow Rate (m^3/h)	Master Meter Volume (L)	Test Meter Volume (L)	Error Of Rate (%)
40 %	72.38	986.94	986.99	0.01
20 %	36.19	493.47	493.33	-0.03
10 %	18.10	253.97	253.82	-0.06
5 %	9.05	125.16	125.00	-0.13



Flow Meter Testing Report (ISO 17025)

(Gravimetric Calibration Testing Report)

FineTek

Quality Center Testing Laboratory

No.16 Ziqiang St., Tucheng Dist., New Taipei City 236, Taiwan(R. O. C.)

測試報告
Testing Report

產品名稱(Product Name)：電磁流量計 Electromagnetic Flow Meter
數量(Quantity)：1 pcs
產品型號與序號(Model No./ Serial No.)：
EPD3005005HLN2F0 (18FEB1-18050674) * 1pcs

顧客名稱(Applicant)：國外業務(SANG CHAI METER CO., LTD.)
地址(Address)：888 PHAHOLYOTHIN ROAD, SAMSEN NAI, PHAYATHAI, BANGKOK 10400, THAILAND

接收日期(Date of Receipt)：2018.05.30
簽發日期(Issue Date)：2018.06.26
報告編號(Report No.)：QE-18061819

ilac-MRA TAF Testing Laboratory 3086

報告簽署人
Signed for and on behalf

Jeremy Chang
Supervisor

The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national / international standard through the calibration of the equipment and evaluated measurement uncertainty herein.
This report must not be used to claim product endorsement by TAF or any agency of the Government.
The test report shall not be reproduced except in full without the written approval of FineTek Corporation.

Page：1 of 4

A5 QR-B-35

Report No.：QE-18061819

1. 測試項目(Testing Item)： 流量測試/Flow rate & Flow volume test
2. 測試日期(Testing Date)：2018/06/22。
3. 測試地點(Testing Place)：宜蘭縣蘇澳鎮頂安路 26 號 /No.26, Ding'an Rd., Suao Town, Yilan County 270, Taiwan (R.O.C.)
4. 測試結果(Result)：
   環境溫度(Environmental Temperature)：28.3 ℃
   相對濕度(Relative Humidity)：96.2 %

Expanded Uncertainty

序號 s/n：18FEB1-18050674							
電子秤編號 Equipment No.(Platform Scales)	流率 Flow rate	口徑 Caliber	受測件量測值 Tested Meter Volume	電子秤量測值 Master Meter Volume	相對器差 Deviation	相對擴充不確定度 Expanded Uncertainty	涵蓋因子 Coverage Factor
	(m^3/h)	(mm)	(m^3)	(m^3)	(%)	(%)	
3000 kg B518883330	21.10	50	0.354960	0.353464	0.42	0.05	1.96
	21.11		0.354950	0.353553	0.40		
	21.12		0.354650	0.353101	0.44		
300kg B519901983	14.33		0.240370	0.240128	0.10	0.05	1.96
	14.33		0.240290	0.240108	0.08		
	14.34		0.241830	0.241414	0.17		
300kg B519901983	7.18		0.121200	0.120882	0.26	0.05	1.96
	7.18		0.120700	0.120234	0.39		
	7.18		0.120760	0.120405	0.29		

5. 測試用標準件(Standard Unit)：

標準件 (Standard Unit)	序號 (Series Number)	追溯機構 (Organization)	追溯編號 (Traceable Number)	追溯日期 (Date)
300 kg	B51888328	中科院(NCSIST) (TAF 0150)	18C400228	2018/04/18
3000 kg	B518883330	中科院(NCSIST) (TAF 0150)	18C400232	2018/04/18

Traceable No.

Page：2 of 4

A5 QR-B-35

ISO 17025 iLAC (TAF) - Traceability

- Repeatability
- Reproducibility
- Stability

- Unit Under Test
- Location

- Method
- Standard
- Progress

- Temperature
- Humidity
- Pressure
- Gravity
- Elevation
- Vibration
- Stress
- Stain

- Education
- Training
- Expertise
- Technique

International Laboratory Accreditation Cooperation

No	Country	Name	Name of Accreditation	Scope	Original Signing Date
1	Australia	NATA	National Association of Testing Authorities, Australia	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	02 Nov 2000 02 Nov 2000
2	Czech Republic	CAI	Czech Accreditation Institute	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	02 Nov 2000 02 Nov 2000
3	Denmark	DANAK	Danish Accreditation Fund	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	02 Nov 2000 02 Nov 2000
4	Egypt	EGAC	Egyptian Accreditation Council	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	10 Oct 2009 10 Oct 2009
5	France	COFRAC	Comite Francais d'Accreditation	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	02 Nov 2000 02 Nov 2000
6	Indonesia	KAN	National Accreditation Body of Indonesia	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	30 Dec 2003 20 Jun 2001
7	Italy	ACCREDIA	ACCREDIA - L'Ente Italiano di Accreditamento	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	07 Oct 2010 02 Nov 2000
8	Lithuania	LA	Lithuanian National Accreditation Bureau	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	19 Jan 2018 19 Jan 2018
9	Malaysia	Standards Malaysia	Department of Standards Malaysia	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	19 Nov 2003 16 Jan 2003
10	Mexico	ema	entidad mexicana de acreditacion a.c.	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	17 Nov 2005 17 Nov 2005

Ps. 2019 Members（103 Economies、100 Accreditations）

International Laboratory Accreditation Cooperation

No	Country	Name	Name of Accrediatation	Scope	Original Signing Date
11	Netherlands	RvA	Dutch Accreditation Council	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	02 Nov 2000 02 Nov 2000
12	Philippines	PAB	Philippine Accreditation Bureau	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	17 Nov 2005 17 Nov 2005
13	Singapore	SAC	Singapore Accreditation Council	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	02 Nov 2000 02 Nov 2000
14	Spain	ENAC	Entidad Nacional de Acreditacion	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	02 Nov 2000 02 Nov 2000
15	Thailand	NSC	National Standardization Council	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	03 Nov 2001 03 Nov 2001
16	Ukraine	NAAU	National Accreditation Agency of Ukraine	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	24 Sep 2014 24 Sep 2014
17	United Kingdom	UKAS	United Kingdom Accreditation Service	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	02 Nov 2000 02 Nov 2000
18	Vietnam	AOSC	Accreditation Office for Standards Conformity Assessment Capacity	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	11 Sep 2019 11 Sep 2019
19	Vietnam	BoA	Bureau of Accreditation	Calibration: ISO/IEC 17025 Testing: ISO/IEC 17025	02 Nov 2000 02 Nov 2000

Ps. 2019 Members（103 Economies、100 Accreditations）

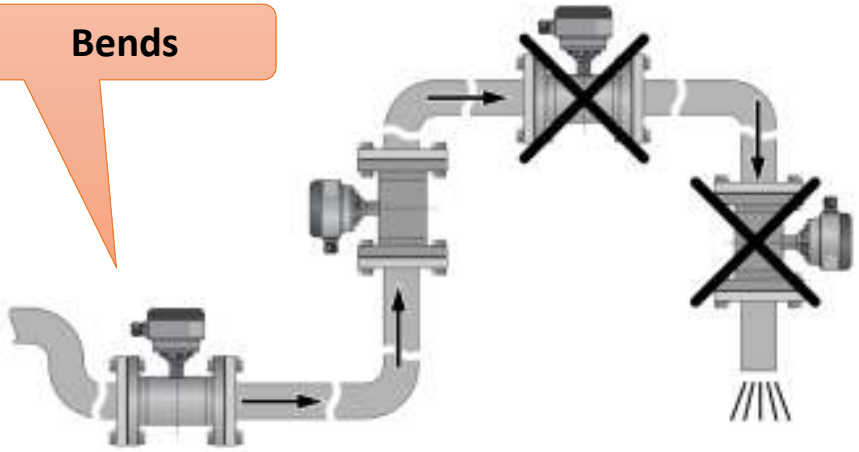
EPD Installation Tips

Installation Tips

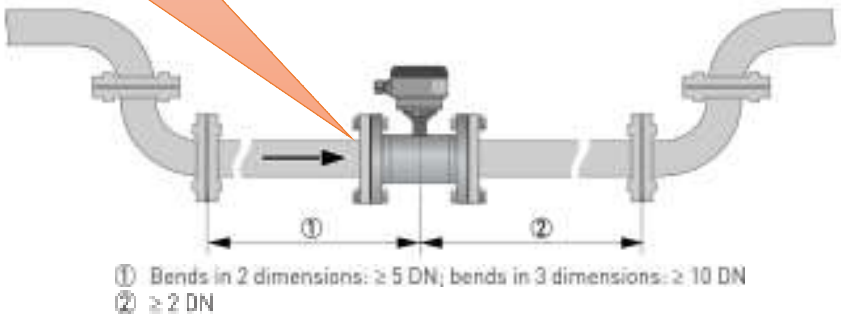
Full of Liquid

FineTek

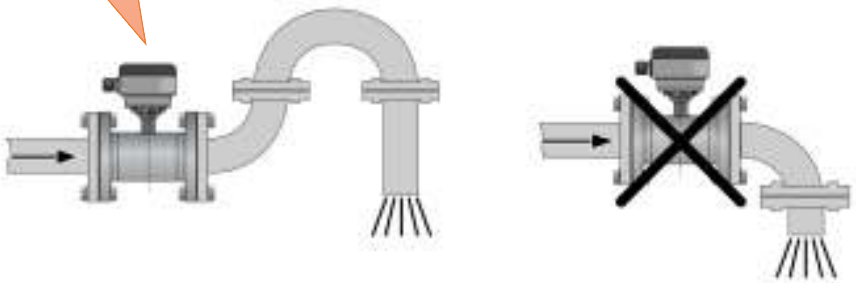
Bends



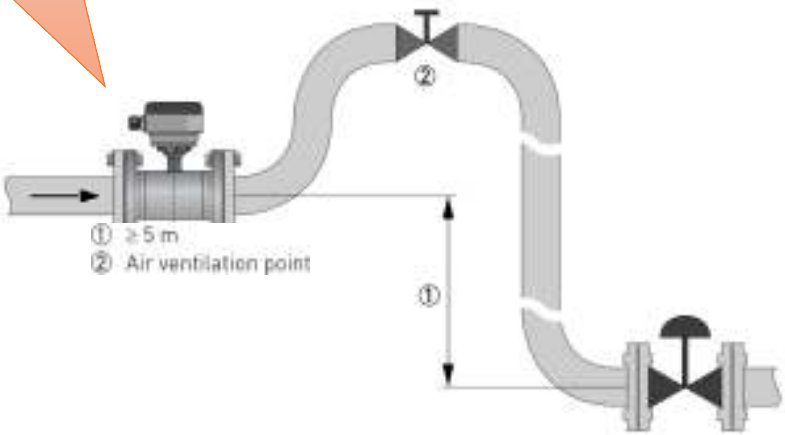
Inlet 5D
Outlet 2D



Open discharge

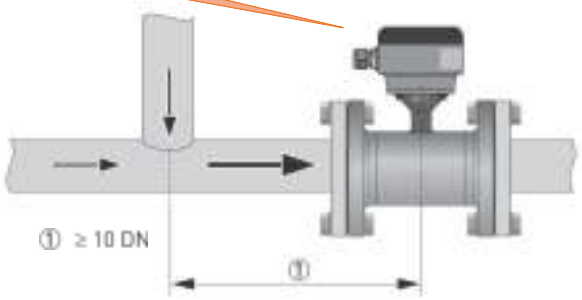


Air venting

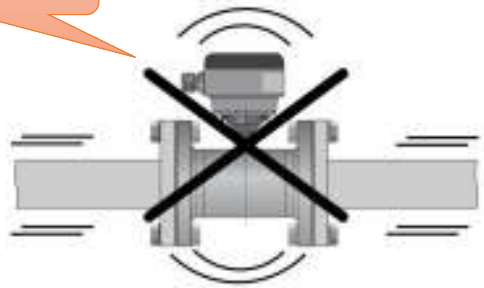


Installation Tips

T-section

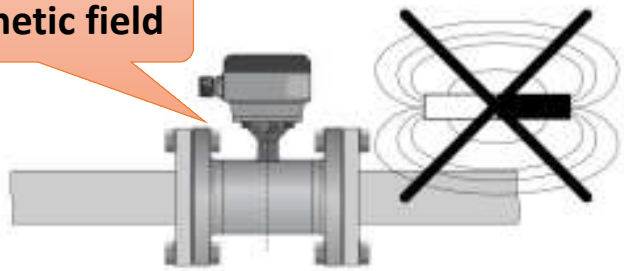


No Vibration

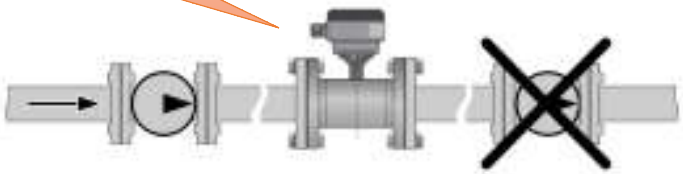


Control Valve

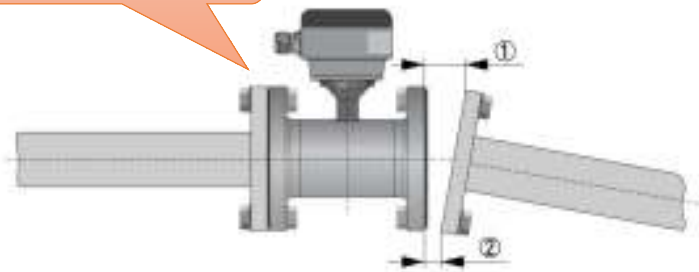
No Magnetic field



Pump



Flange deviation



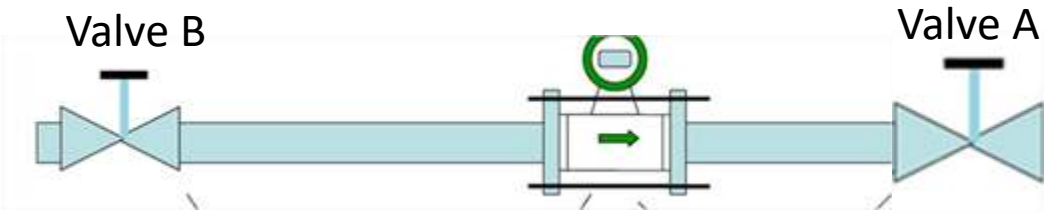
① L_{max} Max. permissible deviation of pipe flange faces:
② L_{min} $L_{max} - L_{min} \leq 0.5$ mm / 0.02"

EPD - Purpose of ZERO Setting

ZERO Setting => Better **Accuracy (First time to use)**

Step

1. Pipeline / Flow meter with full liquid
2. Closing Valve A
3. Closing Valve B
4. Stable Fluid (Waiting for few minutes)
5. Perform Zero calibration



1. **Pipe Size**
2. **Flow Rate Unit**
3. **(Setting Max. Flow Rate => if 4~20mA)**

Ps. It's necessary to be grounded if plastic pipe

How to select EPD – Flow range

Diameter (mm)	Flow Rate Range (m3/h)
	Velocity 0.1~10 m/s
40	0.45 ~ 45.2
50	0.71 ~ 71
65	1.19 ~ 119
80	1.81 ~ 181
100	2.83 ~ 283
125	4.42 ~ 442
150	6.36 ~ 636
200	11.3 ~ 1130
250	17.7 ~ 1770
300	25.4 ~ 2540

If Flow Rate =100 m3/h

How to select EPD - Others

1. **Type**
   - Standard, Remote
2. **Pipe Diameter & Connection Spec.**
   - DN15~DN300
   - ANSI, JIS, DIN
3. **Lining Material**
   - Neoprene, PTFE, NBR
4. **Electrode Material**
   - SUS316L, Titanium, Tantalum, Hastelloy Alloy C276, Others.
5. **Power Supply**
   - 100~240Vac, 24Vdc
6. **Grounding plate (if plastic pipe)**
   - SUS304, SUS316L, Titanium, Tantalum, Hastelloy Alloy C276

EPD Series Comparison

Item	EPD30	EPD31	EPD34	EPD36
Type				
Accuracy	**0.2% ~ 0.5%**			
Flow range	0.1~ 10 m/s			
Tube size (mm)	(15)40-300	40-80	40-300	15-50
Alarm output	x1	x1	**x2**	x1
Digital output Protection	200mA/36VDC			
Power supply	AC: 100-240 Vac 50/60Hz ; DC: 16-36Vdc			
4-20mA Analog input	None	None	**Yes**	None
Sanitary use	No	No	No	**Yes**
Certificate	CE (According IEC-61326 Table 2 Class A)			
Custody transfer	**OIML R49 : 2013**			

Case Study for EPD

Water Supply Network

Reservoir or Dam

Water Purification Plant

Pump Station

Industrial water

Domestic Water

Sewage Treatment Plant

Natural

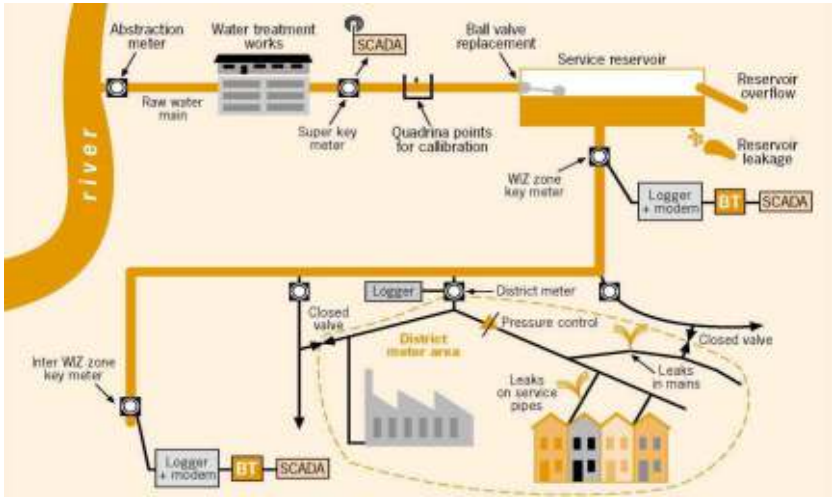
Case Study (Water Company Project)

Case Study (Water Company Project)

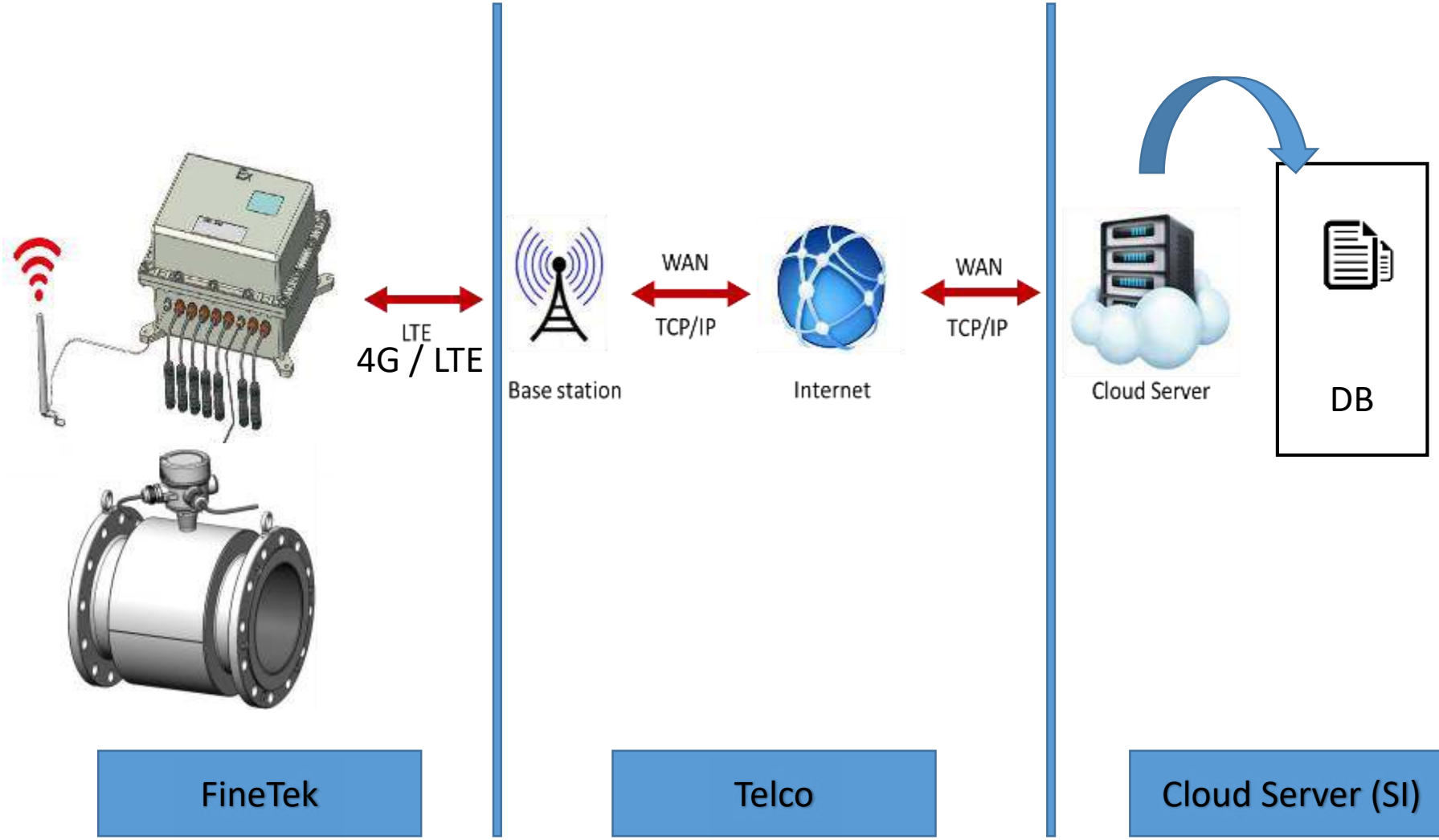
Case Study (Water Company Project)

Water Company

- DMA (District Meter Area)
- Model: EPD39+Pressure Sensor
- Size：DN200/DN300
- Total: 250pcs



System Concept



EPD39 Specification – Flowmeter & Controller

Item	Specification
Power	Battery Pack (Nominal 14.4Vdc)
Display	LCM 128*64 pixel
Measuring Range	**0.05m/s ~ 10m/s (1: 200)**
Pressure Transducer	**Output : 0.5-4.5V, Power:6-15VDC (3-wires)**
Remote setting	RS-485/Modbus with PC software
Analog input	4-20mA with 24Vdc /50mA
Communication port	RS-485 Modbus/RTU with 24Vdc/50mA
Data logger	**250,000 items**
Cell Network	3G/4G-LTE 700(B28)/900(B8)/1800(B3)
Ambient temperature	-20 ~ 70℃
Power Consumption	12W Maximum
Enclosure material	Aluminum alloy
Protection	IP68
EMC	According IEC 61326-1

Water Quality Meter or Others

Flowmeter

Pressure

CH.	1	2	3	4	5	6	7	8	9
FUNCTION	Antenna	Sensor Measurement	Sensor EXT. Current	RS-485 Comm.	4-20 Input	0-5V Input	Remote Control (USB)	Pulse Output	Battery Input

EPD39 Product Feature – Battery

Item	Specification
Nominal Voltage	14.4V
Nominal Capacity	152AH
Cut-off Voltage	8V
Ambient temperature	-20 ~ 60℃ (*1)
Pulse Current	2A maximum
Composition	4S4P
Protection	IP68
Battery Life	10 Years

mode	Measuring frequency (min)	4G transmission frequency (min)	Battery life (year)
MD-01	1	10	**1.1**
MD-02	2	10	**2.3**
MD-03	5	60	**4.0**
MD-04	10	60	**5.5**
MD-05	30	1440	**8.0**

EPD39 Product Feature – Pressure Sensor

PARAMETERS	MIN.
ACCURACY	±0.25 % F.S.
PROOF PRESSURE	2X
BURST PRESSURE	5X
STORAGE TEMP.	-40~125 Deg. C
WETTED MATERIAL	316L

Case Study：EPD39

1. Install flowmeter and grounding at catch basin

2. Install pressure sensor

3. Install controller and wiring flowmeter/pressure sensor

4. Power to controller wiring
5. Install battery fuse
6. Fix the battery braket

7. Adjusted the antenna
8. Check the **RSSI** value

9. Cover manhole lid and testing.

ID	Date	Time	flow_rate	forward_total	reverse_total	bi_drection	pressure	current	RS_485	voltage	rssi
1	20180906	124844	72.84114075	32685.77094	0.129153431	32685.64179	1.003148913	0	0	14.62875271	-111
1	20180906	124944	77.15167236	32687.0568	0.129153431	32686.92765	1.007647276	0	0	14.62875271	-111
1	20180906	125044	71.63079834	32688.25065	0.129153431	32688.1215	1.012145758	0	0	14.62875271	-109
1	20180906	125144	73.75160217	32689.47984	0.129153431	32689.35069	1.016644239	0	0	14.62875271	-111
1	20180906	125244	68.01122284	32690.61336	0.129153431	32690.48421	1.016644239	0	0	14.62875271	-111

Unique Function：Bi-Direction Setting at Remote

Unique Function：(for Taipei Water Company)

- **Bi-Direction** communicates with **flowmeter doing setting** at specific server in private network.

Functions:

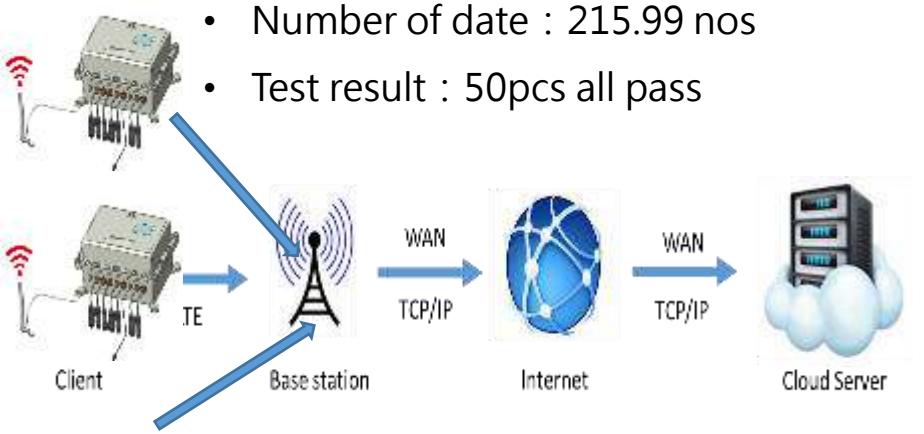
1. Adjust time interval for measurement & logging
2. Adjust time interval for data transmission

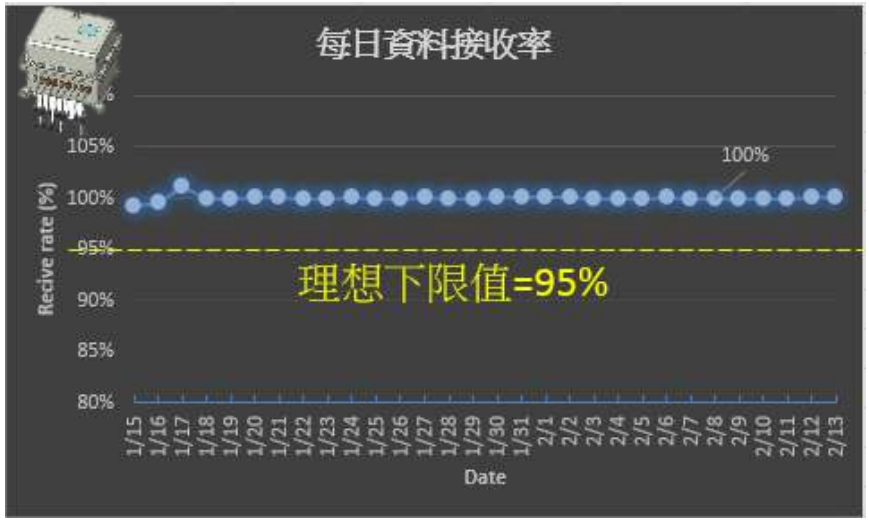
Ps. Above adjust commands will be through internet at remote sever.

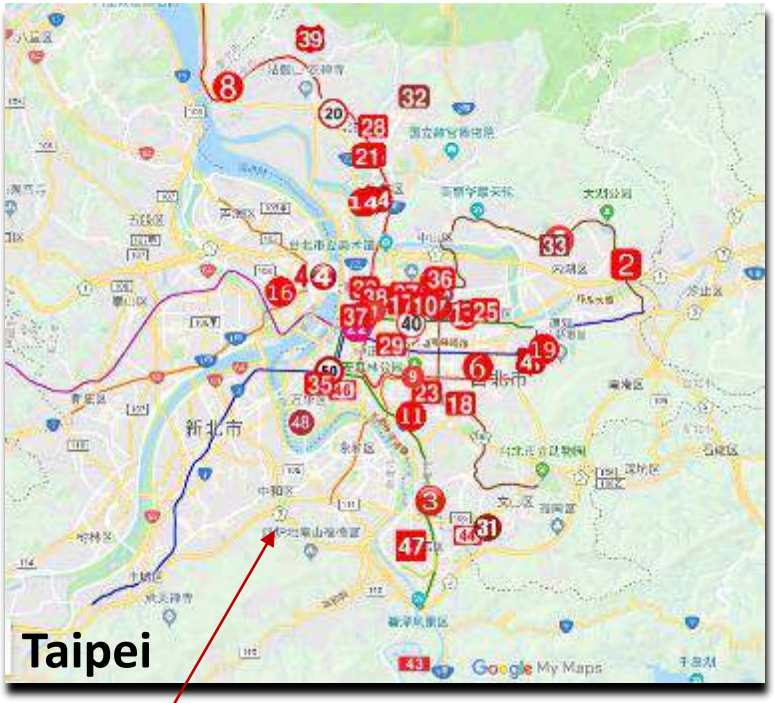
Cost Saving!!

Case Study (EPD39)

- EPD39-wireless date transmission
  - Testing period：15/Jan~13/Feb, 30days
  - Data received：**100%** (> 95%)
  - Number of date：215.99 nos
  - Test result：50pcs all pass







Questions for Battery Power Type

1. Any certificate or criteria required? (Like OIML R.49)
2. 4G/NB-IoT signal strength? Certificate required?
3. How often to log data?
4. How often to deliver data?
5. SI for Water Company?

Case Study

Sewage Treatment Plant
Model: EPD34 / EA

Process:

1. **Flow meter in Outfall Process**
2. **Ultrasonic Level Monitoring in Aeration Process**

Case Study

Biological Wastewater Treatment
in Pharmaceutical Plant
Model: EPD30/34

Process

1. Measuring wastewater and water
2. in sample tank

Case Study

Sewage Treatment in Chemical Plant
Model: EPD30

Process
1. Cumulative Flow for outfall
2. Cost Control





Case Study

Measuring Wastewater in Textile Plant
Model: EPD30

Process

1. Measuring wastewater at normal temperature, and normal pressure.

Case Study

Application

Model : EPD34 DN80 (remote type)

Industry: Brewery

Medium: 70% water, 30% liquor

Case Study

Application

Model : EPD30 DN40

Industry: Food & Beverage

Medium: Wastewater

Grounding to the land with plastic pipe

Case Study

FineTek

Application

Model : EPD30 DN40

Industry: Chemical

Medium: Wastewater

Case Study

Application

Model : EPD30 DN150

Industry: Hoggery

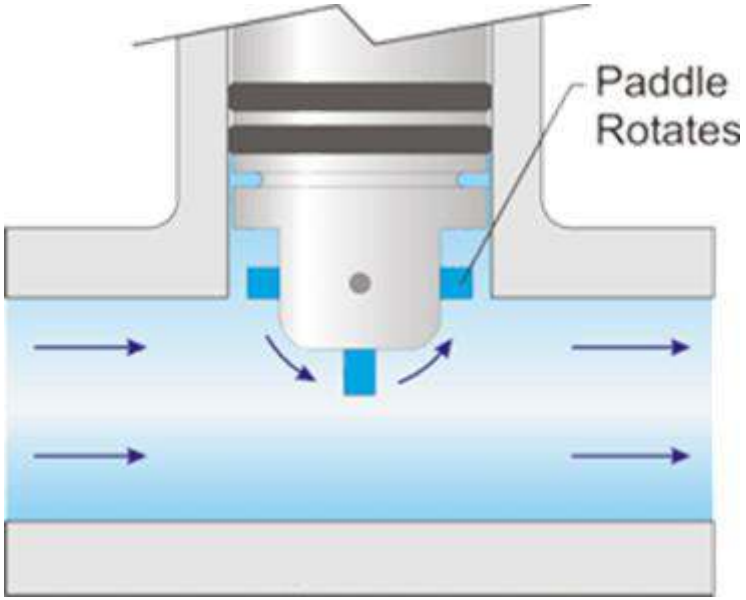
Medium: Wastewater

Make full pipe flow

→ Enhance the accuracy

Paddle Wheel Flow Meter (EPR)

EPR Working Principle



- Classified as a turbine flow meter
- By **embedding a magnet** in the **rotation axis** and on the edge of the paddle, **pulses** can be extracted as signals, converting the number of revolutions into the flow rate.

EPR Features & Specifications

Features

- Analog output: 4-20mA
- Pulse output: NPN & PNP output
- 128 * 64 LCM display
- Modbus RS485 communication interface

Specifications

- Diameter (mm)：DN20, DN25, DN40, DN50
- Flow range：0.3 m/s ~ 10 m/s
- Accuracy：±3%
- Repeatability：0.4 %
- Operating Temperature：-15 ℃~60 ℃
- Pressure ：Max. 10 Bar
- Protection rating：IP66

EPR Common Application

- Food industry
- Beverage industry
- Water treatment industry
- Pharmaceutical industry
- Dyeing industry
- Chemical industry
- Semi-conductor industry
- PCB wet process control

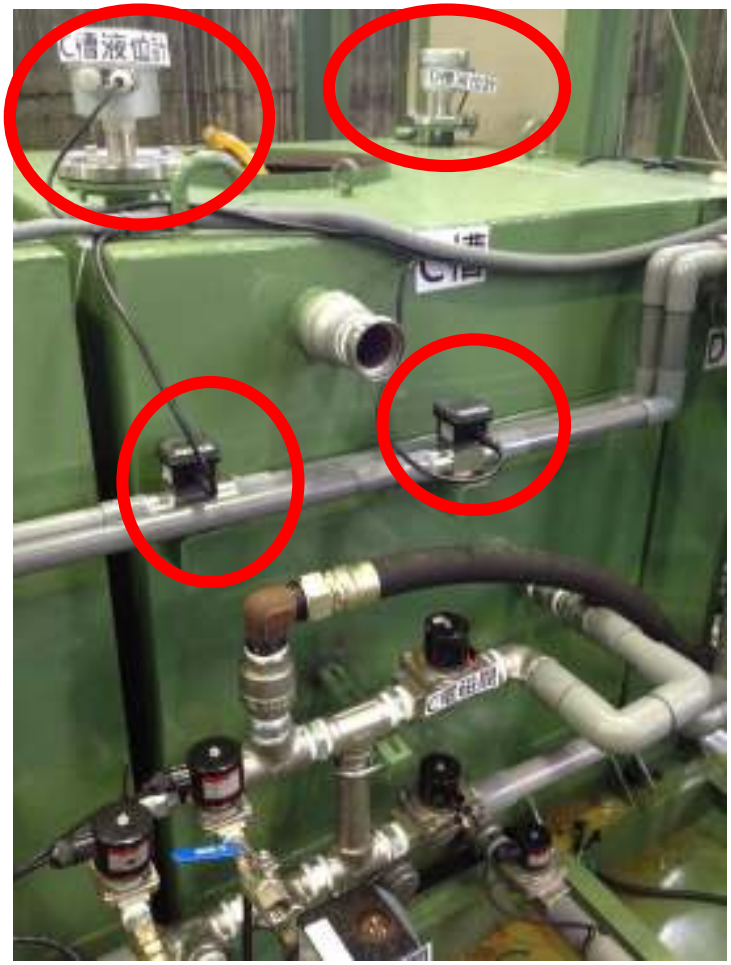
Case Study

Application

Model : EPR FG PB

Industry: Military Sterilization truck

Medium: Water & Chemical



Case Study

Application

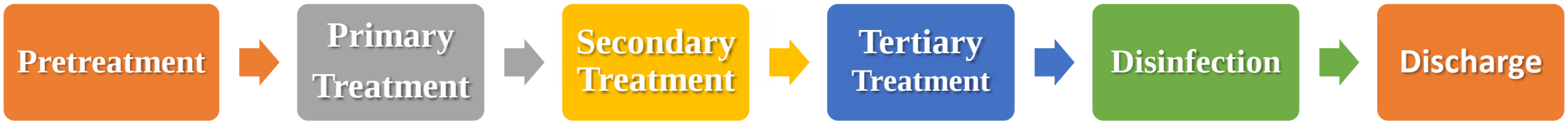
Model : EPR

Industry: Electroplating Wastewater

Medium: Soft Water

II. Waste Water Treatment (WWT) Process

Waste Water Treatment Process



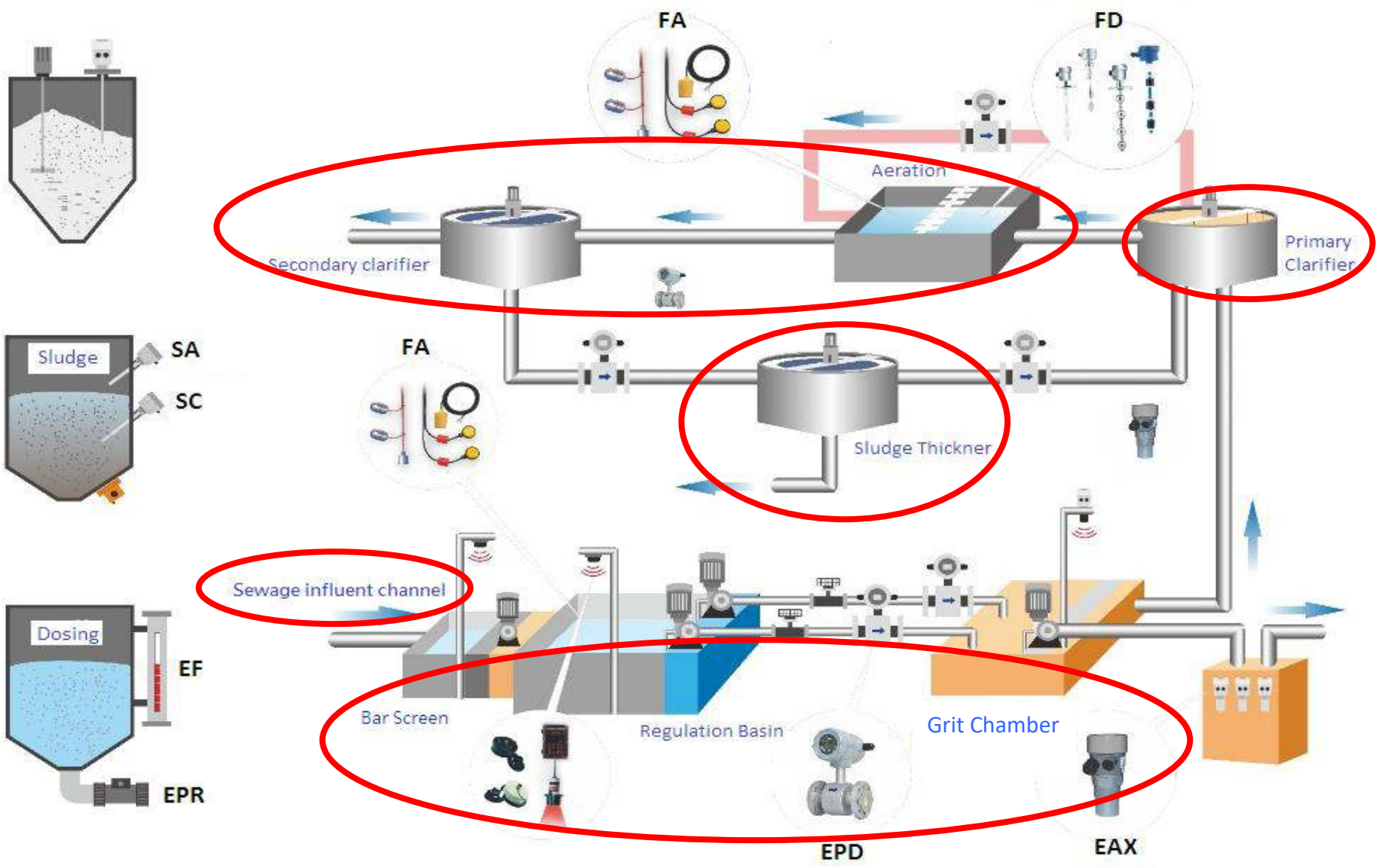
Process	Pretreatment	Primary Treatment	Secondary Treatment (Biological Treat.)	Tertiary Treatment (Advanced Treat.)
Purpose	Remove **materials** can cause **operational problems**	Remove ~60% of solids & ~35% of BOD	Remove ~85% of solids & BOD	Varies: 95+ % of solids & BOD
Function	-Bar screen -Grit chamber -Regulation Basin	-Primary clarifier -Sedimentation -Flocculation	-Aeration basin -Secondary clarifier -Sludge digester	-RO treatment -Activated carbon adaption -Oxidation

Ps. BOD (Biochemical Oxygen Demand)：dissolved oxygen needed by aerobic biological organisms

Sensor Solutions

- **Level Sensors**
  - Contact vs. Non-contact
  - Switch vs. Transmitter
  - Liquid vs. Solid
- **Flow Sensors**
  - Electromagnetic Flowmeter
  - Paddle Wheel Flowmeter
  - Thermal Dispersion Switch
- **Water Quality Meters**
  - pH/ORP
  - Conductivity
  - Turbidity
  - Dissolved Oxygen (D.O.)
  - Chlorine & Chlorine dioxide

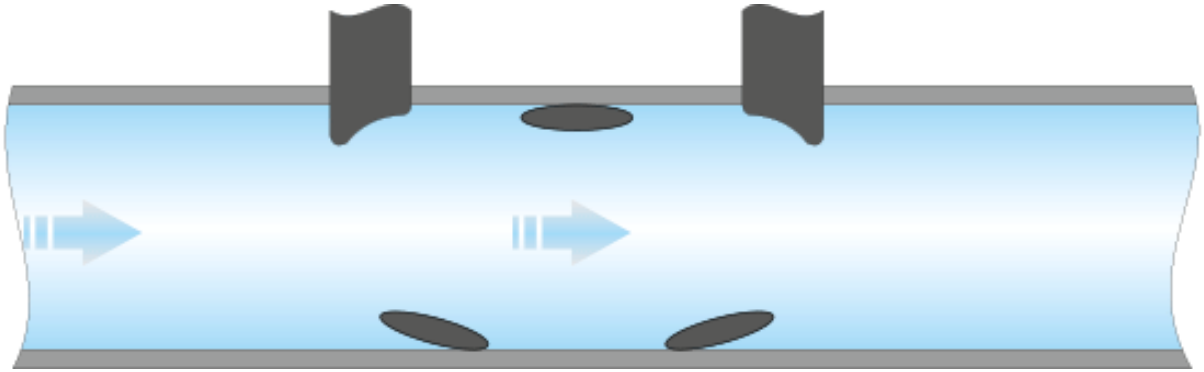
Waste Water Treatment Progress

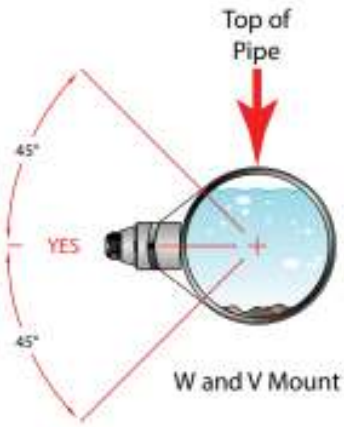


Total Solutions for WWT


Save Water – Save Earth.

Clamp-On Ultrasonic Flowmeter (Time-Transit)





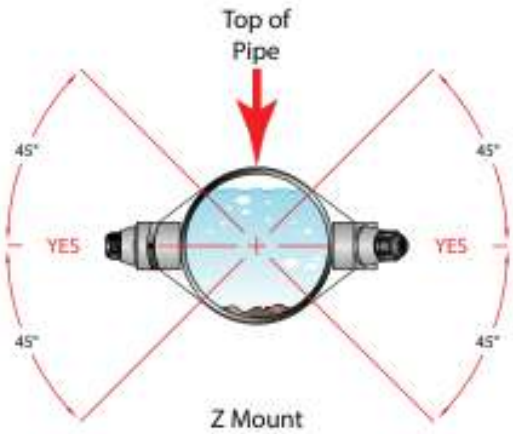


Figure 1: Transducer mounting configurations

Source：https://www.bellflowsystems.co.uk/ultrasonic-flow-meter-guide.html

Clamp-On Ultrasonic Flowmeter (Doppler)