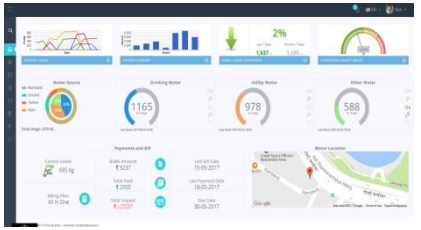
Electronic Water Meter

- Fluidic Oscillation Water Meter

NB-IoT



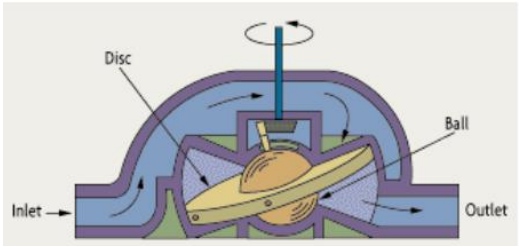
SHIN DONG A Electronics

Technology Trends

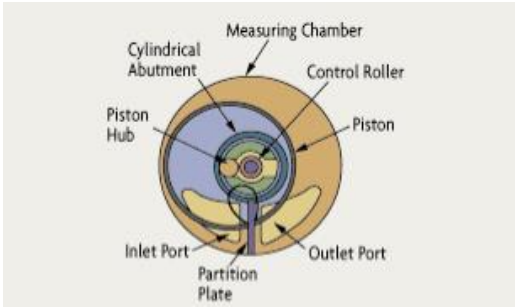
Source : Eighth Annual Water Conservation Showcase

1st Gen

Positive Displacement



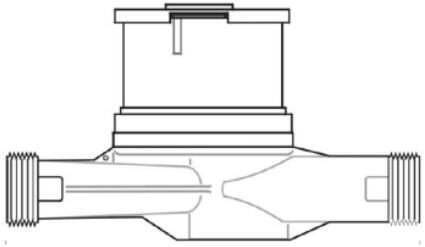
[Nutating Disc]



[Oscillating Piston]

2nd Gen

Velocity



[Single Jet]

[Multi Jet]

3rd Gen

Solid State

Fluidic Oscillator

Ultrasonic

Magnetic

Mechanical Meters

[Advantage]
- Proven Technology
- Widely Accepted and Trusted In the Industry
- Technology has Evolved and Improved Over more than 100 years

[Disadvantage]
- Low flow performance Limitations
- Accuracy relies on Close Tolerances that are subject to wear
- Particles in Water can cause Problem
- Calcium in water can cause Problem
- Maintenance can be required

Solid State Meters

- No Moving Parts to Wear Out
- Particles do not cause Meters to stick or Stop
- No Maintenance
- Better Low Flow Accuracy
- Better High Flow Durability

Polyketone - New Engineering Plastic Technology

Heavy industry

Abrasion/Wear Resistance

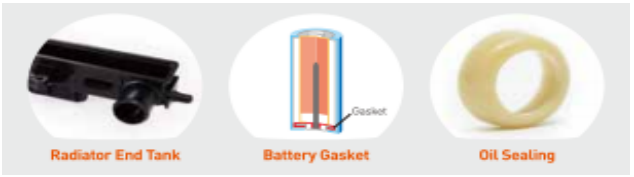
Automotive Industry

Impact Strength

14 times higher wear properties than **POM,** redu cing
Noise issues in variable wear applications

High Precision Industry

Chemical Resistance



Highly resistant to automotive fluids, hydrocarbo n
Solvents, salts and weak acids/bases

For Water Meter

- Good Mechanical Properties
- Human-Friendly Materials (Pb, Zn, Formaldehyde Free)
- Better Hydrolysis Resistance

POLYKETONE(POKETONE) is the world's new materi al
only Hyosung corporation Developed and successfully commercial ized

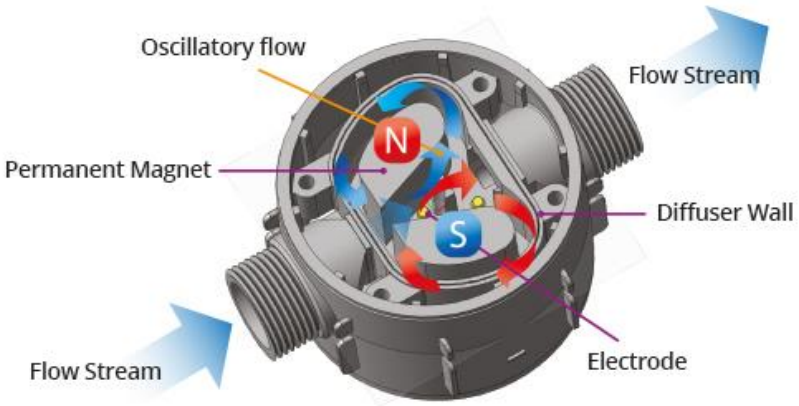
Principle of Fluidic Oscillation

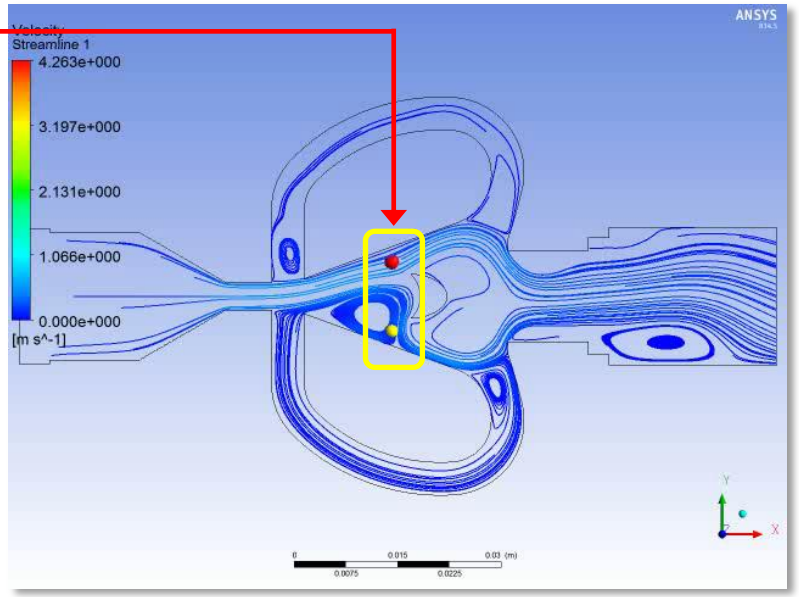
A special design of water flow chamber creates a fluctuating pressure sequence that causes t he water flow to oscillate.

The fluidic oscillator consists of a nozzle, bi-stable diffuser and two feedback channels and cl assified into two different groups – wall attachment devices and jet interaction devices.

The oscillators in the wall-attachment class(our product) are based on the attachment of a fl uid jet to an adjacent wall, a phenomenon known as the "Coanda effect".

Based on magnetic force being produced during this process, Our meter measures flow of w ater detected by 2 electrodes .





Key Difference

	Item	Mechanical	Fluidic Oscillation	Remark
Durability	Moving Parts	Yes	**No**	
	Accuracy	Low	**High**	
	Water Proof	Yes	**Yes**	
	Wear on parts	Yes	**No**	
	Life time	5 years	**10 years**	Incl. Extra Battery Pack
Comfortability	installation	Limited (only Parallel)	**No Limit**	
Water Qaulity	Drinkable water	**Harmful to health**	**Harmless to health**	Hexagon water created Neodium magnet(4,000 gaus)
	Noxious Metals	Metal : PB, Lead, ZN	**Free**	
		Plastic : Formaldehyde		
	Solid Particles	Wear on Moving Parts	**No Solid Particles stuck**	Sand, Grit, Mud & Compound of Calcium
Self-Defense	Appearance	Metal	**Plastic**	Free from Theft
Communication	AMR system	No	**Yes**	
Economic	Import Duty & Tax	Not Applicable	**Flexible**	SKD Shipment available
	Maintenance Cost	every 5 year change	**More than 10 years long**	
	Easy Assembly	Hard	**Easy**	

Hardcore Technology

R200

High Accuracy (R200~R100)

R100 : India // R125 : Indonesia, Peru, Brazil // R200 : S.Korea

impeller

No moving Parts (No Wear)

IP68

Water Proof

No srraight piping installation

H or V

Multiple communi-cation option

Compatible with all AMR

Reverse flow detect

No Air Count

Permanent data storage

Cold-Resistance

▶ Water Meter, hard to be frozen

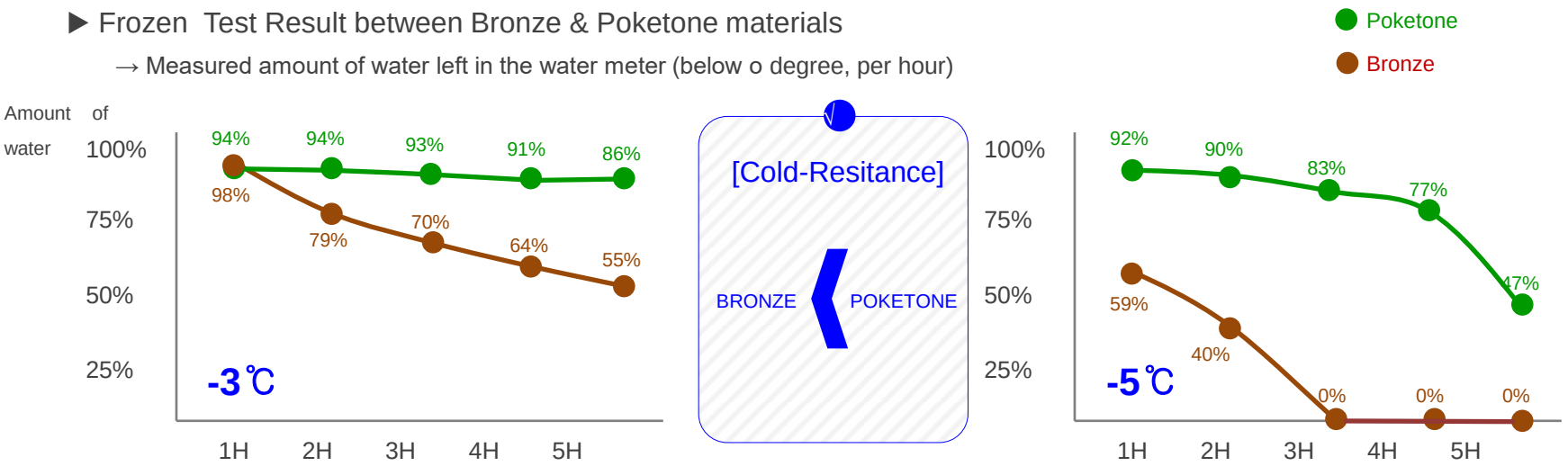
	Mechanical Meter	Fluidic Oscillation Meter
λ : Cold resistance (㎉ / m h ℃)	657 (Material : Bronze)	0.31 (Material : Polyketone)
F : Heating surface (㎡)	Same (1)	Same (1)
Δt : Temperature difference (℃)	- 20℃	- 20℃
Thickness (mm)	10	20

Thermal conductivity (λ : ㎉ / mh℃) : the property of a material to conduct heat

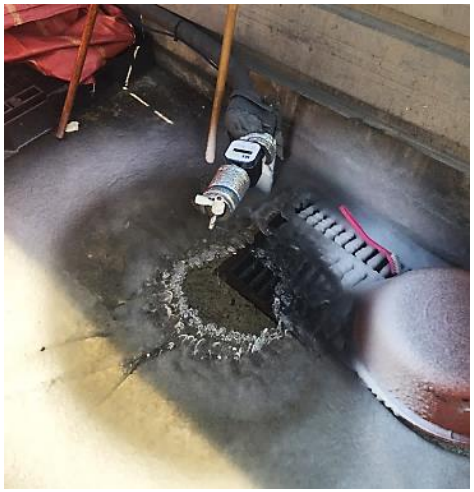
Heat conduction calories = (Thermal conductivity) x (Area) x (T_{hot} - T_{cold}) / Thickness

▶ Frozen Test Result between Bronze & Poketone materials

→ Measured amount of water left in the water meter (below o degree, per hour)



Outdoor Experiment



▸ 경기도 화성시 2016년 1월

일	월	화	수	목	금	토
					1 -4 ℃ | 6 ℃	2 1 ℃ | 10 ℃
3 3 ℃ | 11 ℃	4 -1 ℃ | 8 ℃	5 -3 ℃ | 3 ℃	6 -5 ℃ | 4 ℃	7 -6 ℃ | 3 ℃	8 -7 ℃ | 3 ℃	9 -4 ℃ | 4 ℃
10 -2 ℃ | 7 ℃	11 -5 ℃ | 3 ℃	12 -8 ℃ | 2 ℃	13 -7 ℃ | 2 ℃	14 -10 ℃ | 1 ℃	15 -4 ℃ | 5 ℃	16 -2 ℃ | 5 ℃
17 -2 ℃ | 7 ℃	18 -10 ℃ | 2 ℃	19 -13 ℃ | -7 ℃	20 -13 ℃ | -5 ℃	21 -10 ℃ | -1 ℃	22 -11 ℃ | -2 ℃	23 -14 ℃ | -6 ℃
24 -16 ℃ | -9 ℃	25 -14 ℃ | -2 ℃	26 -7 ℃ | 3 ℃	27 -6 ℃ | 5 ℃	28 -7 ℃ | 5 ℃	29 -2 ℃ | 7 ℃	30 -4 ℃ | 8 ℃
31 -5 ℃ | 1 ℃						

종합통계 최저기온 : -16 ℃ 최고기온 : 11 ℃

▣ Date : Jan 4th ~ Jan 31st, 2016 (during most cold period)

▣ Location : Hwaseong, South Korea.

▣ Ambient Temperature : Lowest - **16℃** // Highest + **11℃**

▣ Test Result

1) The service pipe was completely frozen at **-16℃** even though it was wrapped with heat protector

2) The display runs without freeze and burst.

3) The Water Meter still work normally even when run water placed at service pipe (after warmed water)