

## Data Sheet

### flowIQ® 2250

- Dual band radio
  - AMR (Walk-by/drive-by)
  - AMI (Fixed network)
- Ultrasonic measurement
- Pinpoint accuracy
- 20 year longevity
- Temperature measurement
- IP68 Vacuum sealed construction
- Lead free and certified to NSF/ANSI 61
- Flow measurement in display
- Hourly log



## Contents

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## Electronic ultrasonic cold water meter for measurement of cold water consumption in households, multi-unit buildings and industry.

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### Pinpoint accuracy

Ultrasonic flow measurement guarantees pinpoint accuracy and longevity. Ultrasonic flow measurement is based on the transit time method, and all measurements, references, readings, calculations and data communication are controlled by an advanced, specially designed electronic circuit. Thus, the meter includes no moving parts, which makes flowIQ® 2250 less sensitive to wear and tear and impurities in the water.

### Construction

The meter is hermetically closed and vacuum-sealed to prevent humidity from reaching the electronics and avoid condensation between the glass and display. The meter is IP68 (submersible) type tested and suitable for installation in meter pits.

### Installation

flowIQ® 2250 is easy to install in all operating environments, horizontally as well as vertically, independent of piping and installation conditions. Consumption data can be read visually from the display, using an optical eye, and remotely read, either by 912.5, 915 or 918.5 MHz (AMR) and 450-470 MHz (AMI) band RF signal, built into the meter.

### Specific features

flowIQ® 2250 measures the water and environment temperatures and it includes leak detection, securing that water loss is discovered quickly.

The unique combination of all the flowIQ® 2250 features reduces current operating costs to measure water usage and minimizes unexpected expenses in connection with possible leakage.

### Environmentally friendly

The meter has been approved according to Drinking Water Standards in multiple countries, and it is certified to NSF/ANSI 61. For composite meters the meter housing and measuring part are made of the synthetic material polyphenylene sulfide (PPS) with 40 % fiberglass, which is free from lead and other heavy metals. The environmental report, Carbon Footprint, documents the meter's high reusability and low environmental impact, including recycling of materials. Stainless steel meters are free from lead and other heavy metals. The environmental report, Carbon Footprint, documents the meter's high reusability and low environmental impact, including recycling of materials.

### Hygiene

To protect the health of the consumers Kamstrup has a hygienic manufacturing process of the water meters. Kamstrup has a highly automated manufacturing process, and only uses materials which are approved for drinking water. Furthermore the products gets disinfected before dispatch. The hygiene is being controlled by external accredited laboratories and by frequent audits.

### General description

flowIQ® 2250 is a hermetically sealed water meter intended for measurement of cold water consumption in residential, multi-unit buildings and commercial applications.

flowIQ® 2250 employ the ultrasonic measurement principle, based on Kamstrup's experience since 1991, with the initial development and production of static ultrasonic meters.

flowIQ® 2250 has been subjected to a very comprehensive set of type tests in order to ensure a long-term stable, accurate and reliable meter. One of flowIQ® 2250's many advantages is the fact that it has no wearing parts, which ensures a high and stable accuracy throughout its lifetime. flowIQ® 2250 complies with all the AWWA C715 guideline for Ultrasonic Water Meters.

The flowIQ® 2250 series is fully made in composite, except the largest model, which shares the same platform used in flowIQ® 3250 and has a 2-part body, where the housing is made of composite and the body of stainless steel.

flowIQ® 2250 can and must only be opened by Kamstrup A/S. If the meter has been opened and the sealing has thus been broken, the meter is no longer valid for billing purposes and the warranty is void.

flowIQ® 2250 measures the water consumption electronically, as a volume, using a pair of ultrasonic signals. Through two ultrasonic transducers, an audio signal is sent with and against the flow direction. A transducer serves both as a 'speaker' when transmitting and as a 'microphone' when a signal is received. The ultrasonic signal traveling with the flow will be the first to reach the opposite transducer, while the signal running against the flow will be received a little later. The time difference, between the two signals, can be converted into flow velocity, and thereby also into a volume. The measuring principle is a proven, long-term stable and accurate measuring principle.

flowIQ® 2250's display has been specially designed to operate in a wide temperature range, with high contrast, regardless of lighting – and therefore easy to read – and still have long lifetime.

In addition to volume reading, an indication of current flow and a number of other information codes are displayed. All registers are saved daily in the meter data logger (EEPROM) and are kept for 460 days. Furthermore, monthly data for the latest 36 months, hourly data for the latest 100 days and 50 info code events are saved.

flowIQ® 2250 is powered by an internal lithium battery which can provide up to 20 years operating life.

flowIQ® 2250 is available with a choice of two integrated data communication options:

- 912.5, 915 or 918.5 MHz – Wireless Radio version (RF) for Wireless M-Bus – US localization of European standard for remote reading of meters EN 13757-4
- 450-470 MHz is used in AMI (Fixed network)

The meter is fitted with an optical eye which makes it possible to read saved consumption data and info codes, stored in the meter's data logger. Using an optical reading head, with USB connection, the optical eye, in addition, allows the meter to be configured.

## Technical data

### Electrical data

Battery D-Cell battery, 3.6V, 17Ah. The battery warranty does not apply at meter temperatures above  $t_{BAT} > 95$  °F.

### Mechanical data

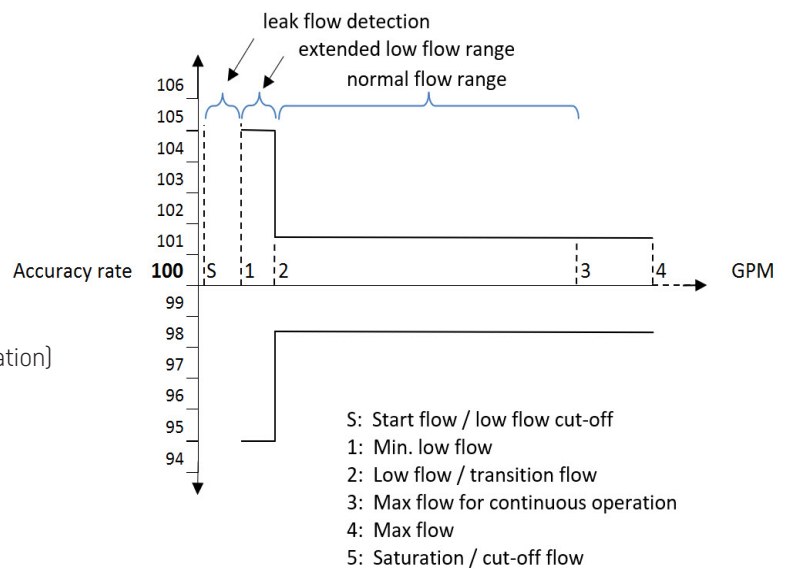
Protection class IP68-rated (waterproof/submersible)  
 Mechanical environment Class M1 (Measuring Instruments Directive classification)  
 Ambient/meter temperature:  
 flowIQ® 2250, composite 35 °F...130 °F  
 flowIQ® 2250, 2-part body 35 °F...130 °F  
 Water temperature:  
 flowIQ® 2250, composite 33 °F...120 °F  
 flowIQ® 2250, 2-part body 33 °F...120 °F  
 Storage temp. empty sensor -10 °F...140 °F  
 Maximum operating pressure 250 PSI (17 bar)

### Accuracy

MPE (maximum permissible error) according to AWWA C715 (except C708 if stated in the order confirmation)  
 ± 5 % in extended low flow range  
 ± 1.5 % in 'normal flow' range

### Approvals

Certified to NSF/ANSI 61  
 Complies to part 15 of the FCC rules  
 Complies with AWWA C715



## Material

### flowIQ® 2250 (Composite model)

#### Wetted parts

Meter housing and flow part Polyphenylene sulfide (PPS) with fiberglass (40 %) reinforcement

Reflectors Stainless steel

#### External meter parts

Top ring (sealing) Polycarbonate (gray)

### flowIQ® 2250 (2-part body model)

#### Wetted parts

Flow part, threaded/flanged Stainless Steel 316L

O-ring/gasket EPDM

Measuring tube PPS with fiberglass

Reflectors Stainless steel

#### External meter parts

Meter housing Polyphenylene sulfide (PPS) – 40 % fibreglass

Cover Glass

Spring ring Stainless steel

Top ring (sealing) Polycarbonate (gray)

## Meter sizes

flowIQ® 2250 is available in these sizes:

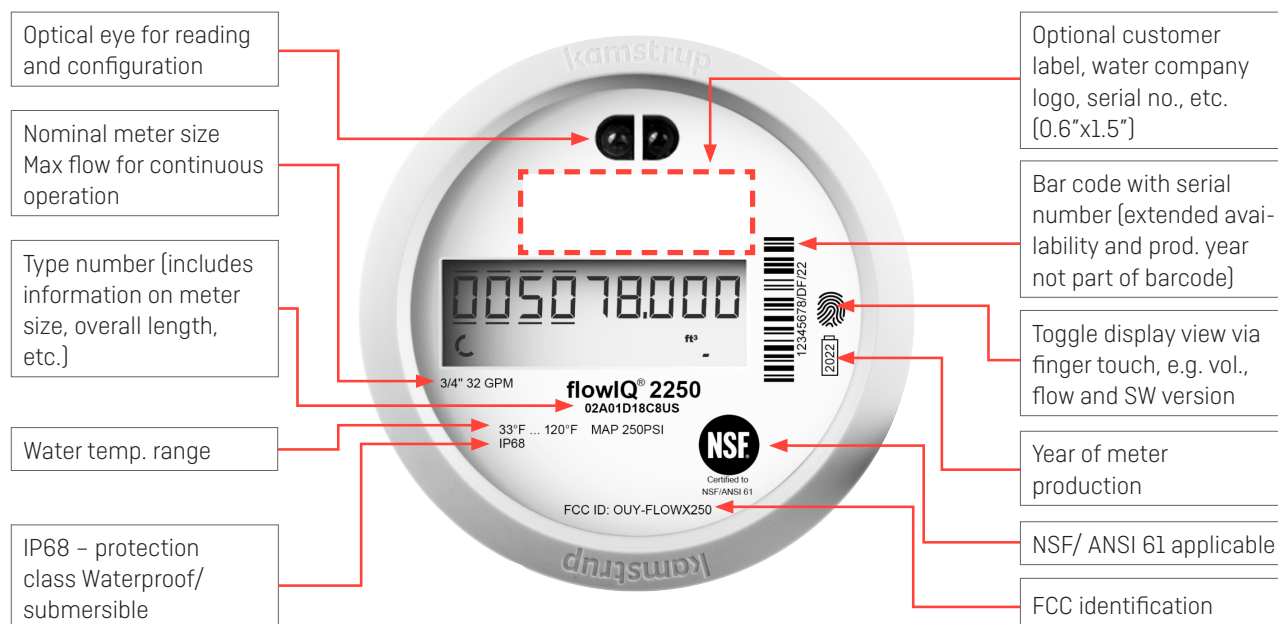
Type number	Meter size	Start flow (S)	Max flow	Min. flow	Transition flow <sup>1)</sup>	Pressure loss SMOC	Connection on meter	Lay length	Non-return valve	Strainer	Temp. measurement of water
RF version	Inches	GPM	GPM	GPM	GPM	PSI	NPSM thread	Inches			
02-A-01-D-1-8A-8US	5/8" x 1/2"	0.015	25	0.10	0.15	7.1	3/4"	7 1/2"	N/A	Yes	Yes
02-A-01-D-1-8B-8US	5/8" x 3/4"	0.015	25	0.10	0.15	7.1	1"	7 1/2"	Yes	Yes	Yes
02-A-01-D-1-8C-8US	3/4"	0.015	32	0.10	0.15	11	1"	7 1/2" or 9"	Yes	Yes	Yes
02-C-01-D-1-8B-8US	5/8" x 3/4"	0.015	25	0.10	0.15	7.1	1"	7 1/2"	N/A	No	Yes
02-C-01-D-1-8N-8US	3/4"	0.025	35	0.10	0.15	5.3	1"	7 1/2"	No	No	No
02-C-01-D-1-8D-8US	1"	0.04	55	0.25	0.4	3.3	1 1/4"	10 3/4"	N/A	No	No

**Note!** 02-A-01-D-1-8C-8US can be ordered with a 1 1/2" extension and washer (installed by the customer) to fit 7 1/2" or 9" lay lengths.

<sup>1)</sup>At flows between 'Start flow' and 'Maximum flow' measurement occurs – however, the accuracy is only guaranteed in the range from minimum flow to maximum flow.

## Meter face details

Meter information in permanent laser engraved text.



## Measurement of temperatures

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### Temperature monitoring

flowIQ® 2250 measures water and ambient temperatures. The measurements can be used to monitor the installation and to give an indication of the temperature of the water when the water reaches the end user. Both temperatures are logged in the daily and monthly records.

Minimum, mean and maximum values are logged daily. The register contains the last 460 days.

On the first day of each month the minimum, maximum and average temperatures, recorded in the past month, are stored in the register. The register stores values from the last 36 months.

Temperature values are referred to in °F and can be read via the optical eye and send by the Wireless RF radio signal. Optional temperature combinations in the radio package are described in the section 'Optional data in data logger'.

### Ambient temperatures

Monitoring the ambient temperature of the installation can be used as a warning of freezing temperatures or unintended high temperatures. The measurement in the meter housing corresponds to the ambient temperature where the meter is installed. The temperature is measured every minute. The maximum and minimum values are calculated based on a 2 minute average value. The average temperature is a time-weighted mean value.

### Water temperatures


Water temperature measurements are made as an indirect measurement of the water using the ultrasound signal. The water temperature is measured every 32 seconds.

The maximum and minimum values are calculated every 2 minutes and is based on an average since the last calculation.

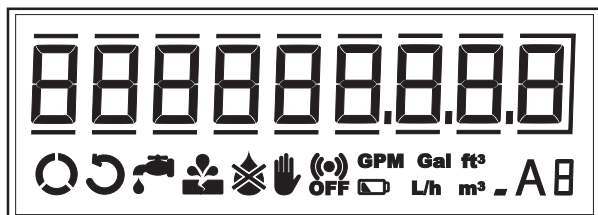
Measurement of water temperature requires that the meter is filled with water. If there is no water within the meter a code will be saved, indicating DRY.










During periods of very low water consumption the water temperature approaches the ambient temperature. In periods where there is no water flow, a code is stored indicating that there is no consumption.

## Display and information codes

The meter is fitted with an easily readable LCD-display including 9 digits, a field for measuring units and an information field with info codes. The three rightmost digits can be used to indicate decimals. Flow can be displayed by activating the fingertouch  button to the right of the display.

The display layout is shown in the figure below:



Info code	Icon/symbol	Meaning
FLOW		The three segments will switch on alternately, to indicate water flow in the meter
REVERSE FLOW		An arrow appears if there is reverse flow
LEAK		Symbol is flashing if the water has not been stagnant in the meter during the past 24 hours. This may be a sign of a leaky faucet or toilet.
BURST		Symbol is flashing if the water flow has exceeded a pre-programmed limit for a minimum of 30 minutes, which is a sign of a pipe breakage
DRY		Symbol is flashing if the meter is not water-filled
TAMPER		Icon appears by attempt of fraud. The meter is no longer valid for billing purposes
BATTERY		Icon appears when the expected capacity left is 6 months
ACTIVE METER INDICATION		A small flashing square indicates that the meter is active
METER ADJUSTMENT	<b>A B</b>	This info code will appear If the meter has been dismantled, tested and the basic flow measurement has been adjusted
RADIO OFF		Symbol is flashing if the meter is still in transport mode with the built-in radio transmitter turned off. The transmitter turns on automatically when the first ¼ gallon of water has run through the meter
VOLUME AND FLOW UNIT	<b>GPM Gal ft³</b> <b>L/h m³</b>	Showing the configured volume unit. (Note! 'GPM' icon flashes continuously when the meter is set up to Imperial gallon)

Information codes 'LEAK', 'BURST', 'DRY' and 'REVERSE' switch off automatically, when the conditions that activated them no longer exist. In other words, 'LEAK' disappears when the water is stagnant; 'BURST' disappears when the consumption falls to normal level; 'REVERSE' disappears when the water no longer flows in the wrong direction; and 'DRY' disappears when the meter again is filled with water.

## Data registers

flowIQ® 2250 has a permanent memory (EEPROM), in which the values of various data loggers are saved. Loggers are available over RF (2 way communication) or through the optical eye.

The meter includes the following registers:

Data logging interval	Data logging depth	Logged value
Yearly logger	20 years	9 Standard data logger in the water meter
Monthly logger	36 months	9 Standard data logger in the water meter
Daily logger	460 days	9 Standard data logger in the water meter
Hourly value	2400 hours (100 days)	9 Standard data logger in the water meter
Info logger	50 events	Info code, meter reading and date
Service log, year	25 years	Minimum Ambient temperature
		Maximum Ambient temperature
		Average Ambient temperature
Service log, month	6 months	Minimum Ambient temperature
		Maximum Ambient temperature
		Average Ambient temperature
Tamper log	10 entries	

Standard data logger in the water meter:

Description	Years	Months	Days	Hours
Logger depth	20	36	460	2400
Operating hours	✓	✓	✓	✓
Info codes incl. hour counter	✓	✓	✓	✓
Volume	✓	✓	✓	✓
Volume reverse	✓	✓	✓	✓
Flow max incl. date	✓	✓	—	—
Flow min incl. date	✓	✓	—	—
Flow max day incl. timestamp	—	—	✓	—
Flow min day incl. timestamp	—	—	✓	—
Water temp. max	✓	✓	✓	—
Water temp. min.	✓	✓	✓	—
Water temp. avg.	✓	✓	✓	—
Ambient temp. max	✓	✓	✓	—
Ambient temp. min.	✓	✓	✓	—
Ambient temp. avg.	✓	✓	✓	—

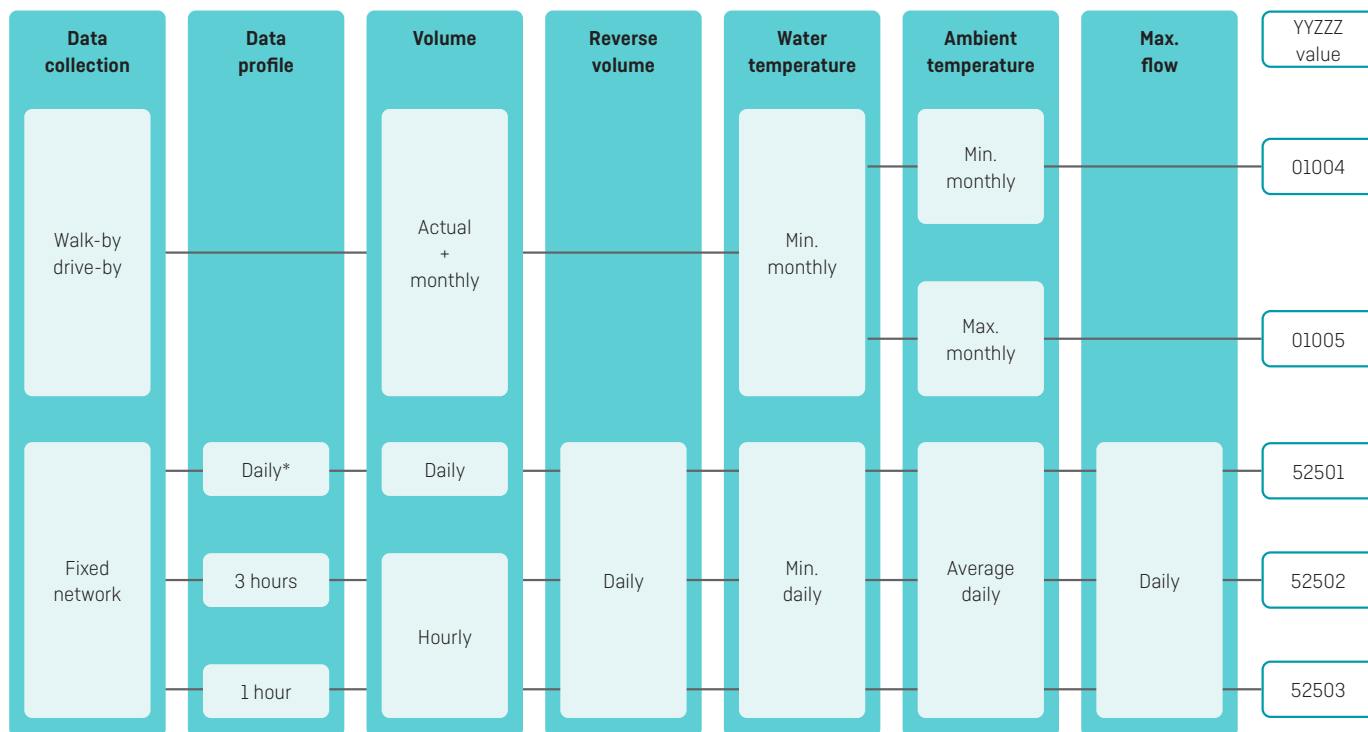
## Radio package options

### Optional RF output

Some of the data sent via a high-power antenna and integrated 912.5, 915 or 918.5 MHz band RF is optional. It is possible to select one of the data packages with content illustrated in the figure below.

The choices are determined by means of the selected YYYY- value when ordering a water meter – shown to the right in the figures.

**Note:** The meters can only be ordered as a walk-/drive-by solution. They can be reconfigured afterwards with REAdy app. to fit into a fixed network solution.



\*The package is transmitted every 3 hours.

## Wireless radio communication

### Standardized and open communication

902-928 MHz band RF is an open standard, following EN13757-4:2010, which means that while the flowIQ® 2250 can be configured with or without encryption of the transmitted signal, encryption is required in the United States.

Encryption protects personal data against unauthorized monitoring. Furthermore, the encryption file provides easy access to import meter data for reading programs.

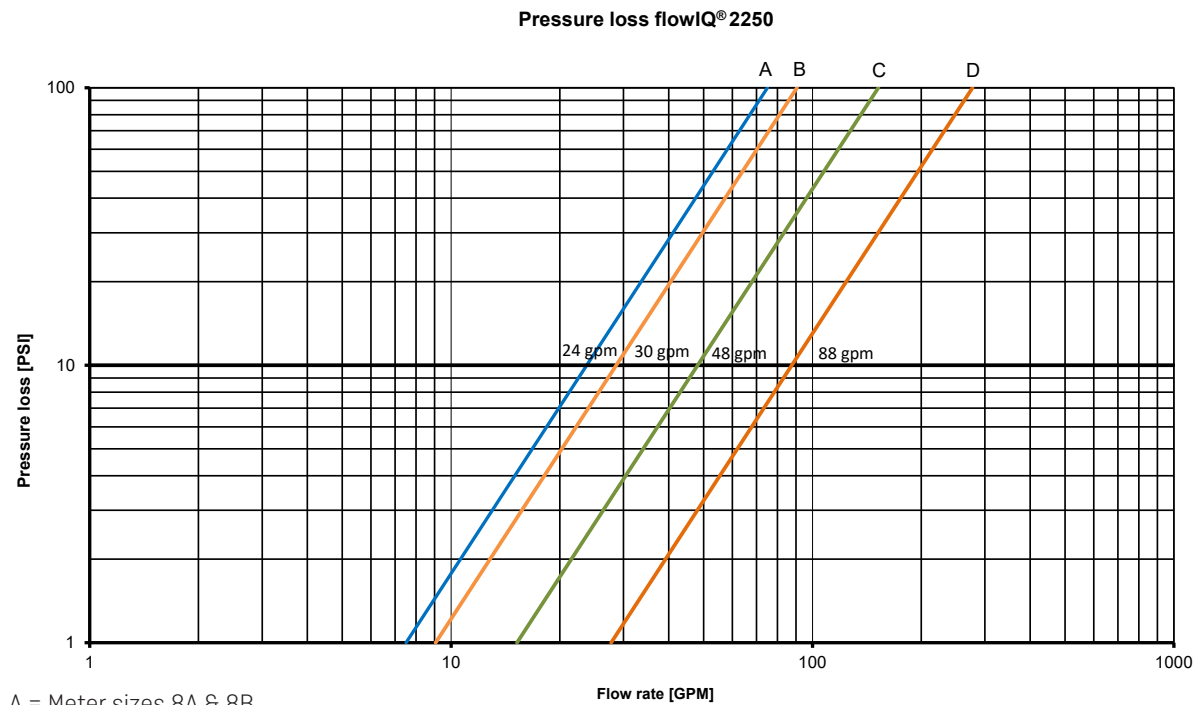
### State of the art meter reader

Kamstrup offers mobile meter reading via either the USB meter reader for wireless platforms or READy for use via android based smart phones and tablets.

## Pressure loss

According to AWWA C715 guideline the maximum pressure loss must not exceed 10 PSI at SMOC.

The following graph shows pressure loss with respect to flow rate:



A = Meter sizes 8A & 8B

B = Meter size 8C

C = Meter size 8N

D = Meter size 8D

## Ordering details

Start your order by stating the type number of the selected model of flowIQ® 2250. The type number includes information on meter type - meter version, size, lay length, service connection and time zone.

Subsequently the meter configuration, which determines customer-specific requirements such as number of digits in display etc., is selected. The configuration is completed during programming of the final meter.

Accessories are enclosed separately to be mounted by the installer.

### Meter type - flowIQ® 2250

Type	□□	□	□	□	□	□□	□	□□
<b>Meter generation</b>								
Second generation	02							
<b>Mechanical design</b>								
1-part body, PPS housing, PPS measuring tube		A						
2-part body, st. steel 1.4408 housing, PPS measuring tube		C						
<b>Communication</b>								
AMI, dual-band capable, [2-way]			01					
<b>Power supply</b>								
1xD-cell				D				
<b>Dynamic range</b>								
AWWA C715					1			
<b>Meter size</b>								
5/8" x 1/2" [25GPM]; 3/4" NPSM; 7 1/2"							8A	
5/8" x 3/4" [25GPM]; 1" NPSM; 7 1/2"							8B	
3/4" [32GPM]; 1" NPSM; 7 1/2"							8C	
3/4" [35GPM]; 1" NPSM; 7 1/2"							8N	
1" [55GPM]; 1 1/4" NPSM; 10 3/4"							8D	
<b>Meter type</b>								
Cold water							8	
<b>Country code</b>								
North America, FCC and NSF approved								US

Kamstrup recommends 3 mm EDPM rubber gaskets, which can be ordered with all flowIQ® composite meters.

Recommended fiber gaskets can be ordered with flowIQ® 2-part body meters.

The features included in the type number cannot be changed once the meter has been produced.

## Configuration - flowIQ® 2250

Config	DDD	JJ	LLL	MMMM	N	P	S	U	RR	CCC	V	T	YY	ZZZ
	□□□	□□	□□□	□□□□	□	□	□	□	□□	□□□	□	□	□□	□□□
<b>Display views*</b>														
Standard	801													
<b>GMT offset</b>														
Time zone														
USA Eastern (GMT-5)		28												
USA Central (GMT-6)		24												
USA Mountain (GMT-7)		20												
USA Pacific (GMT-8)		16												
<b>Target date</b>														
(Handled as order data)														
<b>Max values averaged over time</b>														
(1..120 min.) 2 minutes														
			002											
<b>Customer label</b>														
Alphanumeric (2060-MMMM)														
				0000										
<b>Leakage message limit</b>														
OFF					0									
Flow continuously > 0.25% of nom. flow					2									
Flow continuously > 0.5% of nom. flow					3									
Flow continuously > 1.0% of nom. flow					4									
Flow continuously > 2.0% of nom. flow					5									
<b>Pipe burst limit</b>														
OFF						0								
Flow > 5 % of nom. flow for 30 minutes						1								
Flow > 10 % of nom. flow for 30 minutes						2								
Flow > 20 % of nom. flow for 30 minutes						3								
<b>Ambient Temperature low limit</b>														
OFF							0							
Ambient temperature < 3 °C / 37 °F							3							
Ambient temperature < 6 °C / 43 °F							6							
<b>Ambient Temperature high limit</b>														
OFF								0						
Ambient temperature > 35 °C / 95 °F								3						
Ambient temperature > 45 °C / 122 °F								6						

To be continued on next page...

## Configuration - flowIQ® 2250

Config	DDD	JJ	LLL	MMMM	N	P	S	U	RR	CCC	V	T	YY	ZZZ
	□□□	□□	□□□	□□□□	□	□	□	□	□□	□□□	□	□	□□	□□□
<b>Data logger profile</b>									01					
Standard (default)														
<b>Display resolution (alphanumeric)</b>														
000000.000 ft <sup>3</sup> - 0.01 GPM - Billing in 100s										110				
000000.00 ft <sup>3</sup> - 0.01 GPM - Billing in 100s										120				
000000.00 ft <sup>3</sup> - 0.01 GPM - Billing in 1,000s										130				
0000000.0 ft <sup>3</sup> - 0.01 GPM - Billing in 1,000s										140				
000000.00 USgal - 0.01 GPM - Billing in 100s										210				
000000.00 USgal - 0.01 GPM - Billing in 1,000s										220				
0000000.0 USgal - 0.01 GPM - Billing in 1,000s										230				
00000000.0 USgal - 0.01 GPM - Billing in 1,000s										240				
<b>Temperature units of measure</b>														
Celcius											0			
Fahrenheit											1			
<b>Encryption level</b>														
No encryption												0		
Encryption with separately forwarded key												3		
<b>System</b>														
AMR (Default)													01	
AMI (Configurable with READy app/manager)													51	
<b>Data packages - AMR</b>														
Actual: Vol, Monthly: Vol, Min water temp, Min ambient temp														004
Actual: Vol, Monthly: Vol, Min water temp, Max ambient temp														005
<b>Data packages - AMI (Configurable with READy app/manager)</b>														
Default, Daily - Vol, reverse vol, Min water temp, Avg ambient temp, Max flow														501
Default, 3 hour - Vol, reverse vol, Min water temp, Avg ambient temp, Max flow														502
Default, 1 hour - Vol, reverse vol, Min water temp, Avg ambient temp, Max flow														503

\* Volume and software version are always a part of display views

	DDD	JJ	LLL	MMMM	N	P	S	U	RR	CCC	V	T	YY	ZZZ
Unless otherwise stated in the order, Kamstrup supplies the following:	801	□□	002	000	4	3	3	3	01	220	1	3	01	004

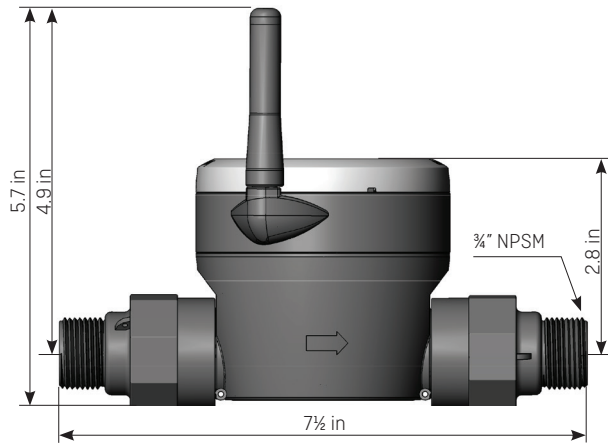
**Note:** JJ (timezone) and target date are not predefined and has to be chosen in the ordering system.

## Dimensional sketches – flowIQ® 2250 (composite)

NOTE! Same threads for in- and outlet.

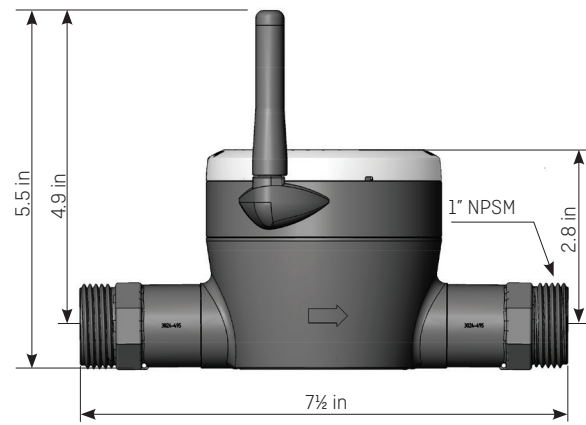
Type: 8A

Size: 25 GPM  $\frac{5}{8}$ " x  $\frac{1}{2}$ " x  $7\frac{1}{2}$ "



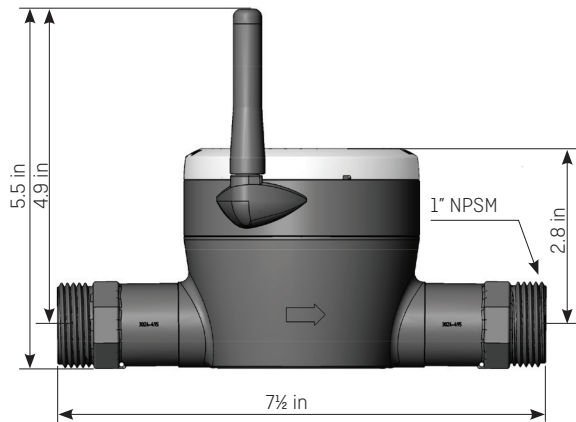
Type: 8B

Size: 25 GPM  $\frac{5}{8}$ " x  $\frac{3}{4}$ " x  $7\frac{1}{2}$ "



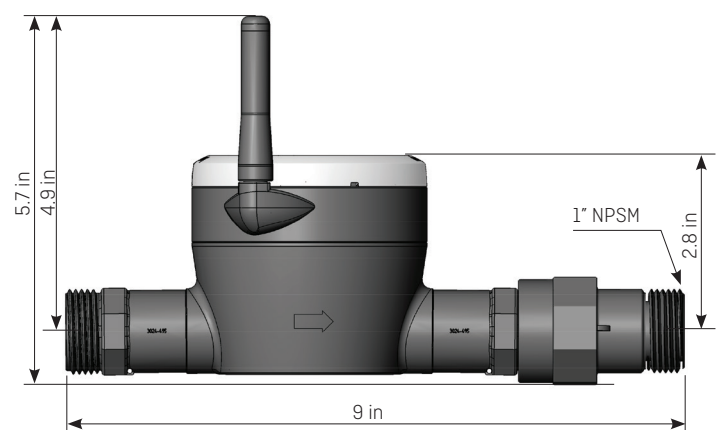
Type: 8C

Size: 32 GPM  $\frac{3}{4}$ " x  $\frac{3}{4}$ " x  $7\frac{1}{2}$ "



Type: 8C+

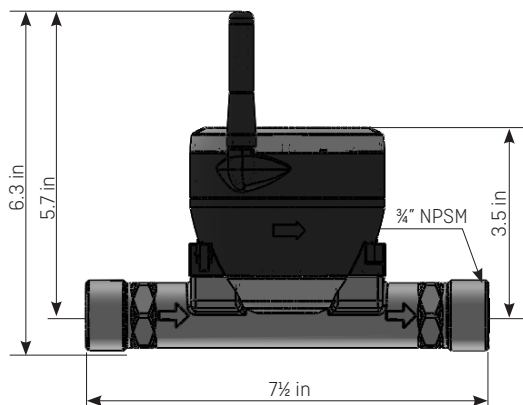
Size: 32 GPM  $\frac{3}{4}$ " x  $\frac{3}{4}$ " x 9"



## Dimensional sketches – flowIQ® 2250 (2-part body)

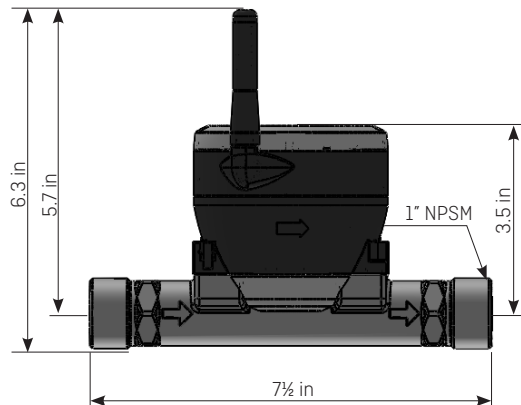
Type: 8B

Size: 25 GPM  $\frac{5}{8}$ " x  $\frac{3}{4}$ " x  $7\frac{1}{2}$ "



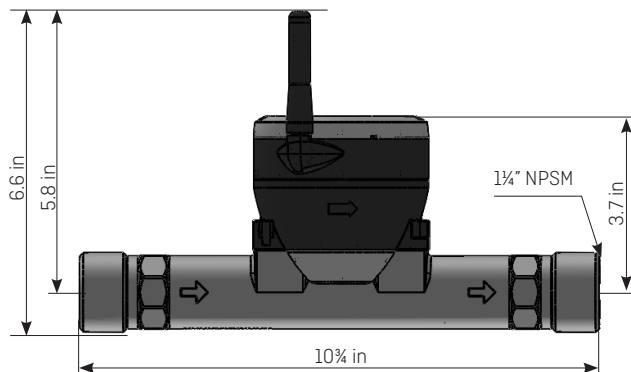
Type: 8N

Size: 35 GPM  $\frac{3}{4}$ " x 1" x  $7\frac{1}{2}$ "



Type: 8D

Size: 55 GPM 1" x  $1\frac{1}{4}$ " x  $10\frac{3}{4}$ "



Mechanical design	Meter type	GPM	NPSM thread	L	H	øD	Weight approx. [Lbs]
				[Inch]			
PPS	8A	25	$\frac{5}{8}$ " x $\frac{1}{2}$ "	$7\frac{1}{2}$ "	5.7"	3.6"	1.07
PPS	8B	25	$\frac{5}{8}$ " x $\frac{3}{4}$ "	$7\frac{1}{2}$ "	5.5"	3.6"	1.02
PPS	8C	32	$\frac{3}{4}$ "	$7\frac{1}{2}$ "	5.5"	3.6"	1.02
PPS	8C+	32	$\frac{3}{4}$ "	9"	5.7"	3.6"	1.11
Steel	8B	25	$\frac{5}{8}$ " x $\frac{3}{4}$ "	$7\frac{1}{2}$ "	6.3"	3.6"	1.02
Steel	8N	35	1"	$7\frac{1}{2}$ "	6.3"	3.6"	2.2
Steel	8D	55	$1\frac{1}{4}$ "	$10\frac{3}{4}$ "	6.6"	3.6"	4.1

## Accessories

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See Accessories for Water Meters: [FILE100000644\\_EN-US](#).

[Accessories are ordered separately in CPQ (Kamstrup ordering system) and will be delivered as single parts in the packaging.]