

## APPLICATIONS

The D-Flow UFO ASIC measures the time of flight for the sound pulse in both directions between the transducers. The sing-around method makes it possible to achieve a time resolution down to a few picoseconds. The micro processor then uses the time of flights for different calculations.

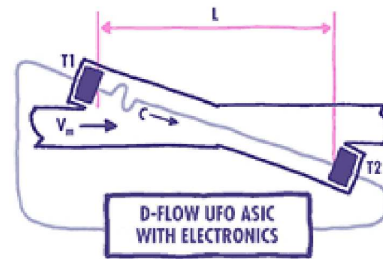
### LIQUID FLOW

The D-Flow UFO ASIC and our piezo-based transducers are the basis for our liquid flow technology. The technology applies to any pure liquid. D-Flow has developed evaluation platforms for hot and cold water distribution, district heating, gasoline and other applications in sizes from DN 10 up to DN 80.

The D-Flow UFO ASIC handles two pairs of transducers for dual path solutions. For multi beam solutions with path of equal length, any number of paths can be added without restriction. Multi path solutions can also be achieved by using more than one ASIC within the same electronics board.

Typical performance of water flow meters based on the D-Flow technology is displayed below. The performance has been validated in water at temperatures between 15 and 80°C. The D-Flow liquid flow platforms comply with the uncertainty statements of the district heating specification EN 1434. All uncertainty statements are made with a 95 % confidence level.

- Zero flow stability:  $\pm 1$  mm/s
- Maximum flow velocity:  $\sim 15$  m/s
- Repeatability:  $\pm 0.25$  %
- Total uncertainty:  $< \pm 1$  % of measured value in a range of 1:50
- Total uncertainty:  $< \pm 2$  % of measured value in a range of 1:100
- Total uncertainty:  $< \pm 5$  % of measured value in a range of 1:300



### GAS FLOW

D-Flow has developed evaluation platforms for hot and cold air, natural gas, fuel vapour, propane and other applications in sizes from DN 10 up to DN 70.

The D-Flow UFO ASIC handles two pairs of transducers for dual path solutions. Multi path solutions can be achieved by using more than one ASIC within the same electronics board.

Typical performance of gas flow meters based on the D-Flow technology is displayed below. The performance has been validated in air at temperatures between 15 and 55°C. The D-Flow gas flow platforms comply with the uncertainty statements of the natural gas specification ENV 14236. All uncertainty statements are made with a 95 % confidence level.

- Zero flow stability:  $\pm 2$  mm/s
- Maximum flow velocity:  $\sim 30$  m/s
- Repeatability:  $\pm 0.3$  %
- Total uncertainty:  $< \pm 1$  % of measured value in a range of 1:150
- Total uncertainty:  $< \pm 2$  % of measured value in a range of 1:300

### LEVEL

D-Flow offers a complete technology for level and distance meters based on the D-Flow UFO ASIC. The transducers can either be mounted above or below the surface.

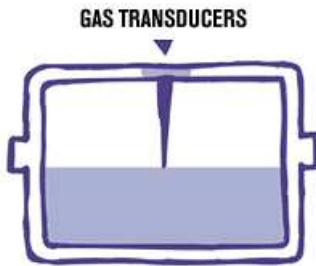
#### Level top-down

In this set-up gas transducers are mounted above the

level surface. Suitable applications are break fluid level, cooling liquid level in automobiles, medical devices etc.

Typical level meters based on the D-Flow technology in air exhibit the following characteristics. All uncertainty statements are made with a 95 % confidence level.

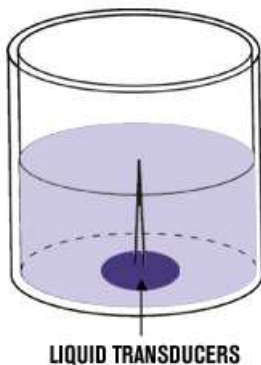
- Repeatability:  $\pm 0.001$  mm
- Total uncertainty:  $\pm 0.1$  mm



## Level Bottom-up

In this set-up D-Flow liquid transducers are mounted at the bottom of the tank. Typical level meters based on the D-Flow technology in water display as below. All uncertainty statements are made with a 95

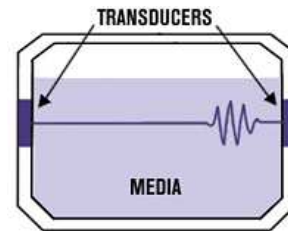
- Repeatability:  $\pm 0.01$  mm
- Total uncertainty:  $\pm 1.0$  mm



## 0.1 ANALYSIS

In addition to its flow and level metering technologies, D-Flow offers methods for measuring speed of sound in the measured media. A speed of sound device can be used for calibrating level meters and media concentration calculations, for example percentage of alcohol in beer.

The total uncertainty of the speed of sound measurement depends more on mechanical tolerances than the actual time measurement. The typical repeatability in air and water is better than  $\pm 0.01$  and  $\pm 0.1$  m/s respectively.



## COMPANY INFO

D-Flow is a knowledge-based company that specializes in ultrasound technology, mainly for flow measurement. Our knowledge is based on 20 years of research in ultrasonics and flow measurement technology. For further information, please visit [www.d-flow.com](http://www.d-flow.com).

## CONTACT INFO

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