



**KEP**  
Technologies



# U-FLOW

Gas flow measurements



**setsafe**  
KEP TECHNOLOGIES

# NUCLEAR MEASUREMENT

KEP Technologies is a full solution provider. With **SETS SAFE** we offer standard and customized nuclear measurement solutions. We manage entire projects from the feasibility study up until installation, training and maintenance, as required.

We are confident that with KEP Technologies you will find measurement solutions with the performance needed to characterize and efficiently manage your nuclear materials. This being the case no matter which of our below market segments you may work in.

## WASTE & DISMANTLING

Characterization of nuclear waste or materials for safety, for the selection of storage mode, legacy waste, materials transportation – Radiological inspection before dismantling – Thermal management.

## DEFENSE

Safeguard, accounting, inventories – Control of Special Nuclear Materials content – Waste management – Parts and assembly manufacturing control – Automated storage and disposal.

## INDUSTRY

Safeguard, accounting, inventories – Uranium enrichment - Waste characterization - Automated storage and disposal - Parts and assembly manufacturing control.

## RESEARCH

Stability and thermal properties - Thermophysical properties - Characterization of waste from the dismantling of research reactors or facilities.



## THE KEP TECHNOLOGIES ADVANTAGE

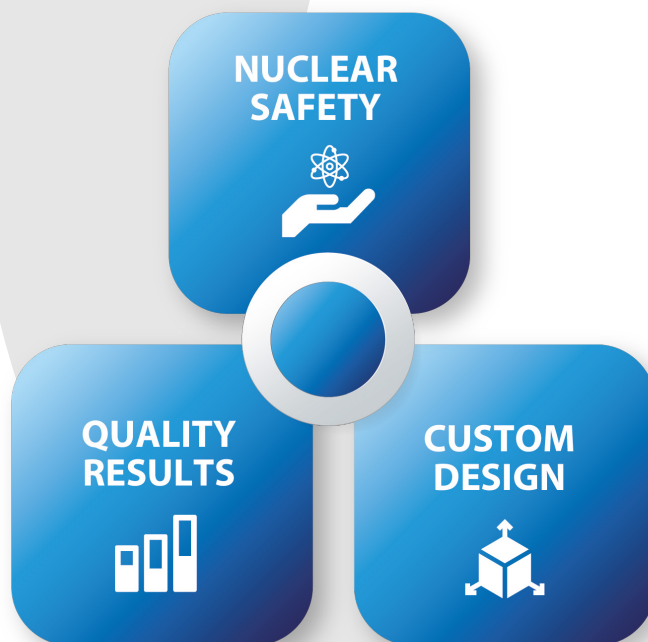
Each **U-FLOW** solution incorporates three essential elements to ensure the best nuclear measurement:

**QUALITY RESULTS**, thanks to the application of our proprietary technologies or the integration of the most reliable technologies on the market

**NUCLEAR SAFETY**, taking into consideration your constraints: radiological environment, data protection, seismic resistance

**CUSTOM DESIGN**, with solutions tailored to your specific needs

We know that solutions providing these benefits deliver the highest value to our customers.



## OUR SOLUTIONS

**U-FLOW** solutions provide online, non-intrusive gas flowrate measurements.

They apply thermal flowmeters technology based on temperature variation measurements of the gas flowing in a bypass. These temperature variations are correlated with gas flowrate variations in the main pipe.

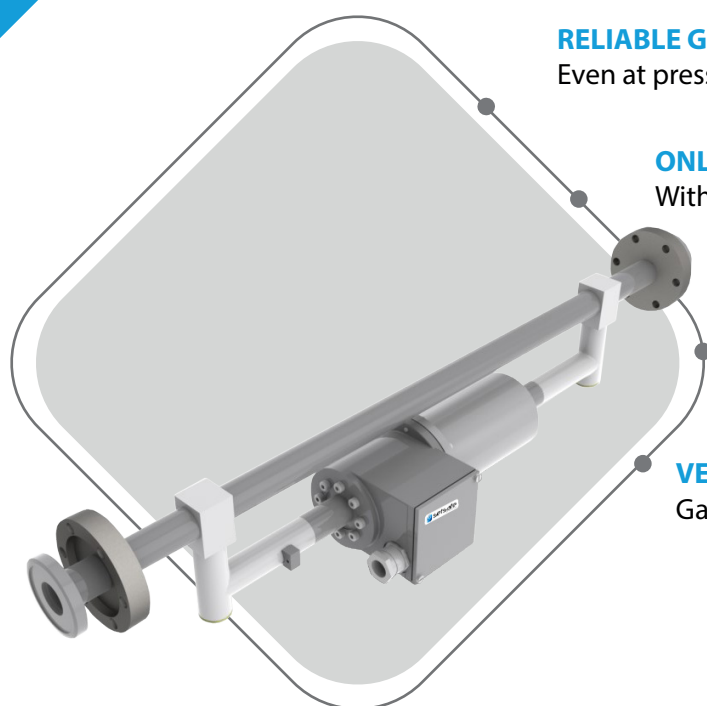
Besides their excellent measurement reliability, **U-FLOW** solutions benefit from a low impact of pressure or temperature variations, a large measurement range, and fast reaction to flow fluctuations.

Our solutions operate at the low pressures required by uranium enrichment processes. Their 316 L stainless steel bodies are made to resist highly corrosive conditions linked with the presence of UF<sub>6</sub> in these processes.



# U-FLOW

## FOR NON-INTRUSIVE GAS FLOW MEASUREMENTS



### RELIABLE GAS FLOW MEASUREMENTS

Even at pressures below 1 mbar

### ONLINE AND NON-INTRUSIVE MEASUREMENTS

Without moving parts and without significant pressure loss

### LONG LIFETIME

Thanks to its stainless-steel design

### VERSATILE

Gas flow rate ranges from a few g/h to several kg/h

PERFORMANCE		SENSOR ALONE	U-FLOW
<b>Nominal range (g/h)</b>		5	20 ; 50 ; 150 ; 400*
<b>Measurement threshold (g/h)</b>		0.01	0.5% of the nominal value
<b>Pressure</b>	<b>Pressure drop at 10 torr and nominal flowrate (torr)</b>	0.002	0.03
	<b>Minimum pressure (torr)</b>	0.2	0.8
	<b>Maximum pressure (torr)</b>	120	100
	<b>Pressure sensitivity coefficient at 50°C</b>	0.27% between 10 and 100 torr	0.27% between 10 and 100 torr
	<b>Zero drift**</b>	0.03% of the nominal value per °C	0.04% of the nominal value per °C
<b>Temperature</b>	<b>Transient drift</b>	0.1% per °C/h	0.1% per °C/h
	<b>Temperature sensitivity coefficient</b>	0.15%/°C between 10 and 40 °C	+ 0.15%/°C between 10 and 40 °C
<b>Accuracy and linearity</b>			+/- 1% of full scale
<b>Repeatability</b>			+/- 0.5% of full scale
GENERAL			
<b>Calibration</b>		Nitrogen at 760 torr	
<b>Temperature of use</b>		From 1 to 40 °C	
<b>Humidity</b>		50 to 95% RH	
<b>Power supply</b>		230 V (50 or 60 Hz)	

\* Other flowrates : consult us

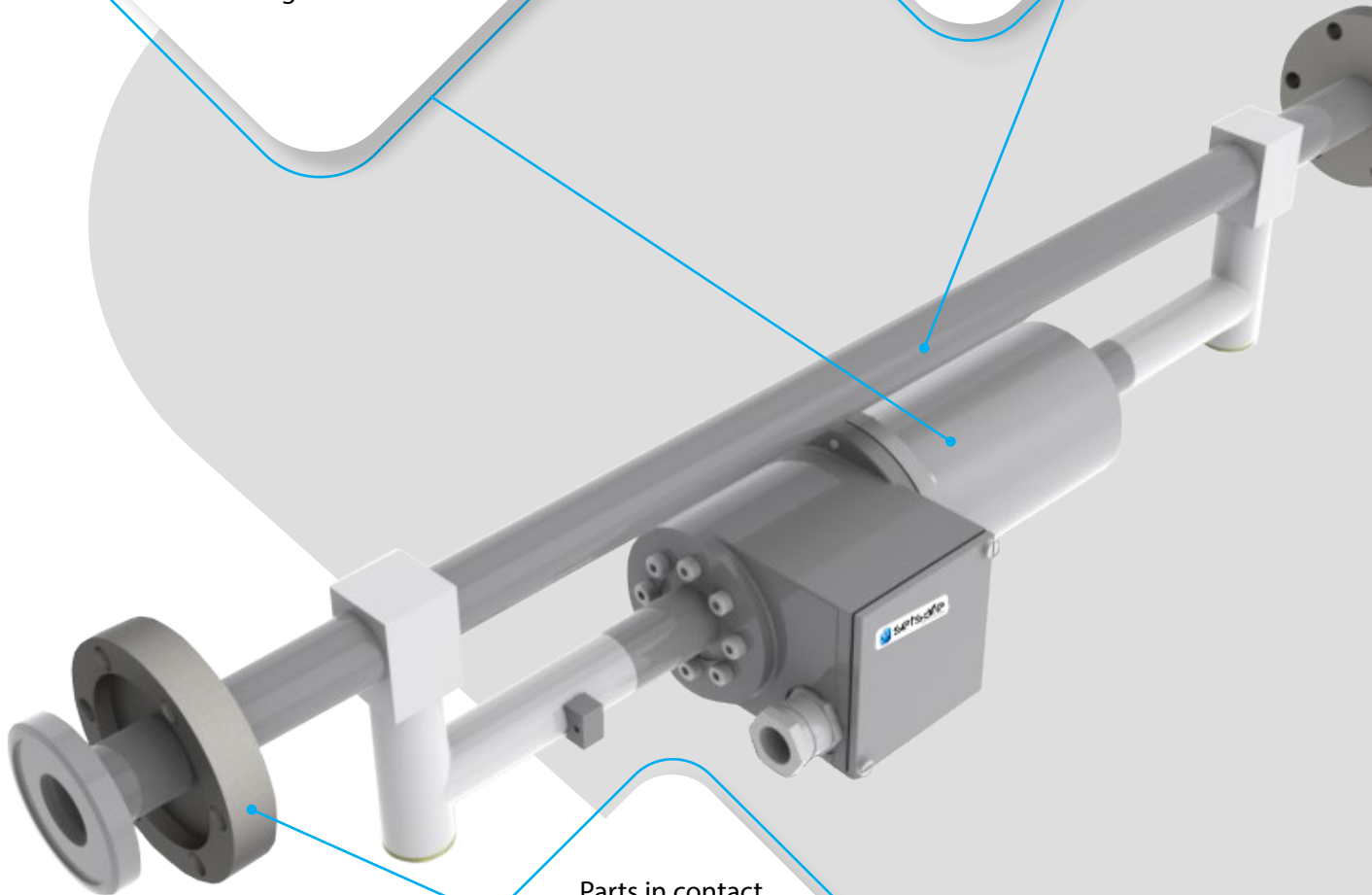
\*\* Drift of sensor's zero with ambient temperature, between 10 and 40 °C, under 10 torr, at the thermal equilibrium.

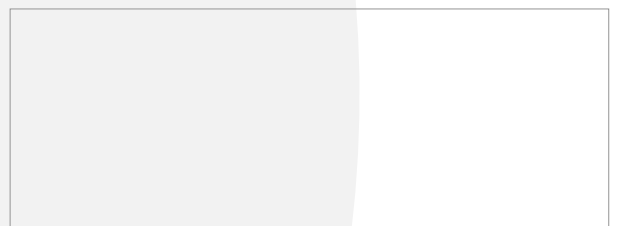
# GAS FLOW RATE MEASUREMENTS

The sensor is a **thermal flowmeter** with a 5g/h nominal flowrate. Its output signal is proportional to the mass flowrate in the pipe. It is symmetrical, which means the flowing direction doesn't impact measurement. Only signal polarity changes with the change of direction.

For applications requiring a higher nominal flowrate than the sensor's, a "bypass" is added. Its length and diameter are specific. It **allows for measuring higher flowrates, up to several kg/h.**

Parts in contact with the gas are made of 304L or 316L stainless steel. Specific connection flanges can be provided.





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