IN SITU SAMPLING WITH DEFLECTING TUBE

- > Made to order design
- > Sampling up to 1500°C flue gas
- > Accessories to increase sensor life-time

ZR PROBE NEW GENERATION

The deflecting tube is designed to drive and cool down the gas from the furnace to the probe (see picture above). The general working principle of the **deflecting sampling tube** is described on the following sketch :

The combustion gas flows in the furnace duct and comes towards the end of the deflecting tube. Thanks to a pressure difference phenomenon, the combustion flue gas stream is deflected inside the tube and flows to the sensor and then rejected to the furnace duct.

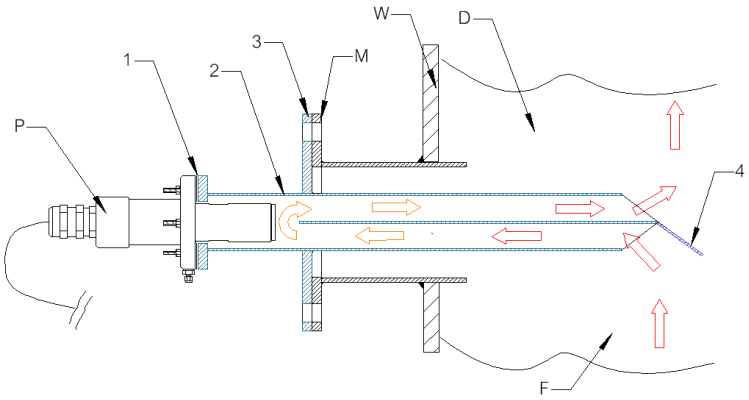
This in situ sampling process features several benefits:

- > The sample is cooled down enough (lower than 500°C in principle) before being analyzed.
- > The condensates and solid or liquid unburnt compounds are trapped to prevent Zirconium Oxide damage.
- > Response time is optimized due to the flow speed.
- > The probe is mounted outside of the furnace for easy maintenance and replacement.

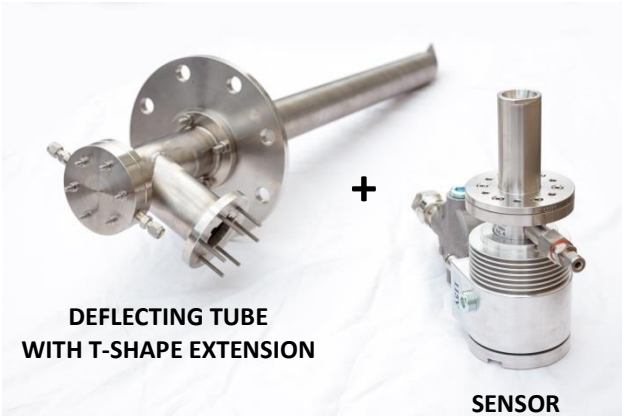
- > The tube is designed to fit to your combustion.

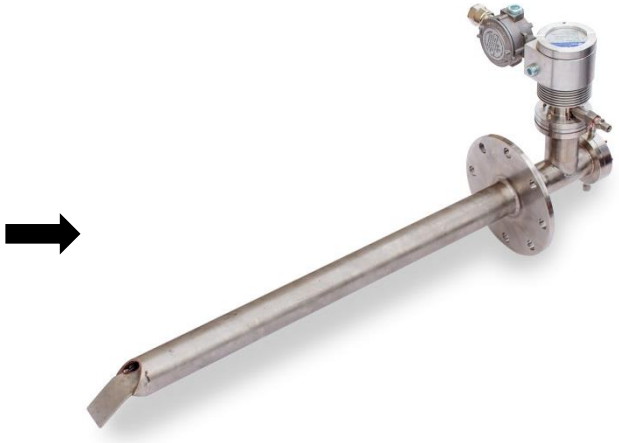
The deflecting tube is customized for your combustion process and furnace design.

Tubes are made to orders in the RB-Technologies workshop based on specifications requirements and validated on drawings by customer approval (ISO9001 processus).



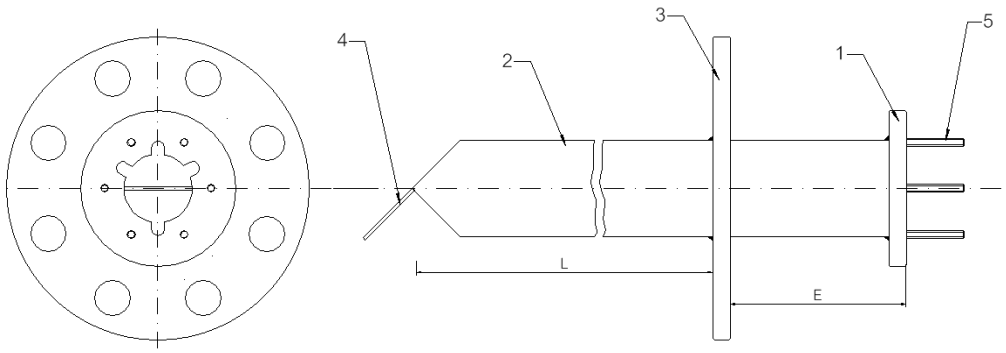
ASSEMBLY WITH PROBE





OUTLINE DIMENSIONS

In RB-Technologies system, the deflecting tube is designed to lead and cool down the gas from the furnace to the probe (see picture above). The basic mechanical configuration is described on the following sketch :



Nbr	Designation
1	PROBE MOUNTING FLANGE – SS316L
2	FURNACE MATING FLANGE – SS316L
3	PLATE for tube partitioning

Nbr	Designation
4	TUBE – Ø60.3mm
5	PLATE SPOON for fumes deflection

The deflecting tube is custom designed to fit the combustion process and furnace design.
Tubes are made to orders in the RB-Technologies workshop based on specifications requirements and validated on drawings by customer approval (ISO9001 processus).

TUBE STANDARD DESIGN

MATERIAL	316L Stainless Steel	Flue gas from 80°C to 800°C
	310 Stainless Steel	Refractory for flue gas from 600 to 1100°C
	Inconel 600	Corrosion Proof, Refractory : up to 950°C
	Kanthal	Refractory : 900 to 1500°C
LENGTH	300 to 2000mm long	The length is designed to reach the optimized sampling point.

The mating flange and the insert tube are not in RB-Technologies scope of supply. We therefore provide tubes with flanges that fit to the on-site mating flanges.

Tube lengths have to be designed to get an appropriate flue gas sample.

ACCESSORIES & CUSTOM DESIGN

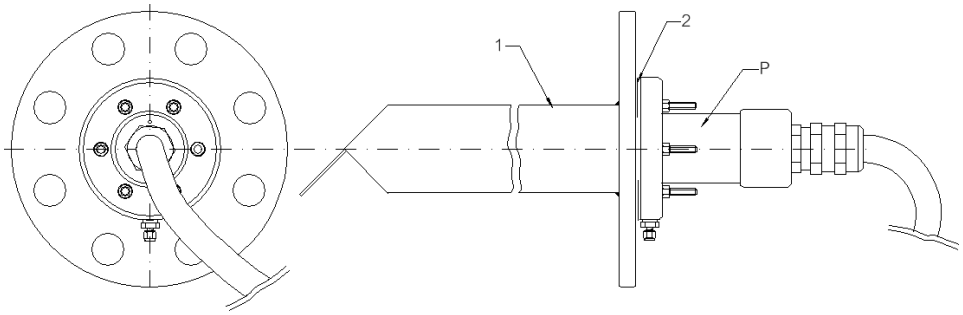
In some difficult applications, the deflecting tube standard configuration may not prevent the probe from clogging or being corroded by the flue gas. In such case, deflecting tubes performance can be improved by adding accessories that can be combined and adapted to fit the process requirements at best. Please refer to RB-Technologies for further information on the accessories.

ACCESSORIES

Accessories can be combined and adapted to fit the process requirements at best

> TUBE WITHOUT EXTENSION

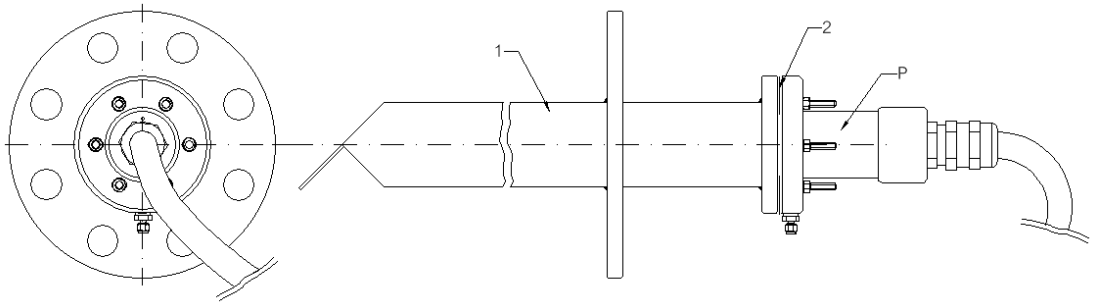
Deflecting tubes without extension are installed to maintain the probe nose at high temperature. It is recommended to limit condensation on low to medium temperature and corrosive combustion processes.



1	Deflecting Tube	2	Probe Gasket
P	ZR Probe		

> TUBE WITH EXTENSION

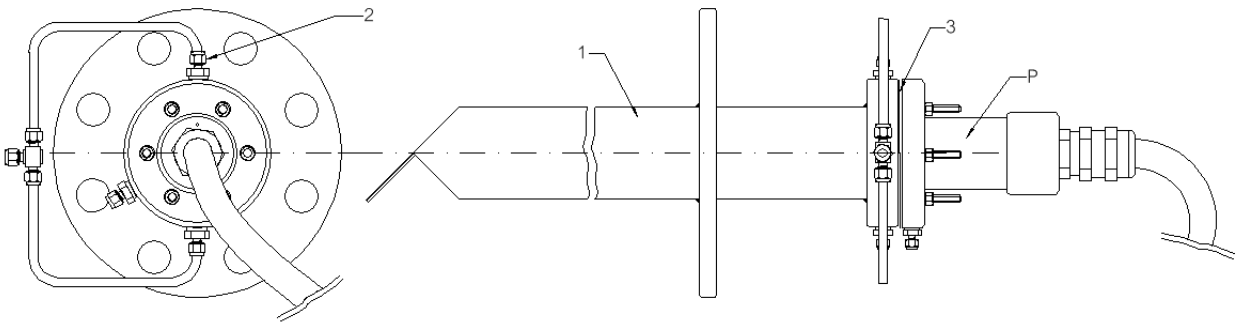
Deflecting tubes with extension are the most convenient to use thanks to separate mounting flanges. It is recommended for high temperature combustion processes.



1	Deflecting Tube	2	Probe Gasket
P	ZR Probe		

> BLOW-OFF SYSTEM

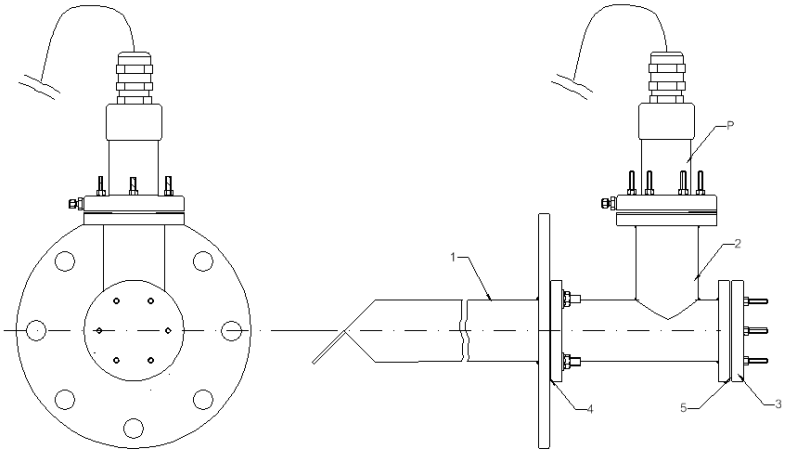
If deflecting tube may get clogged quickly due to significant amounts of dust or solid particles and condensates, pressured air can be pushed into the tube to clean it. Oxygen converters enable automatic and settable blow-off.



1	Deflecting Tube	2	Blow-off Connectors for pressure air
3	Detector Gasket	P	ZR Probe

> T-SHAPE EXTENSION FOR VERTICAL MOUNTING AND TANGENTIAL SAMPLING

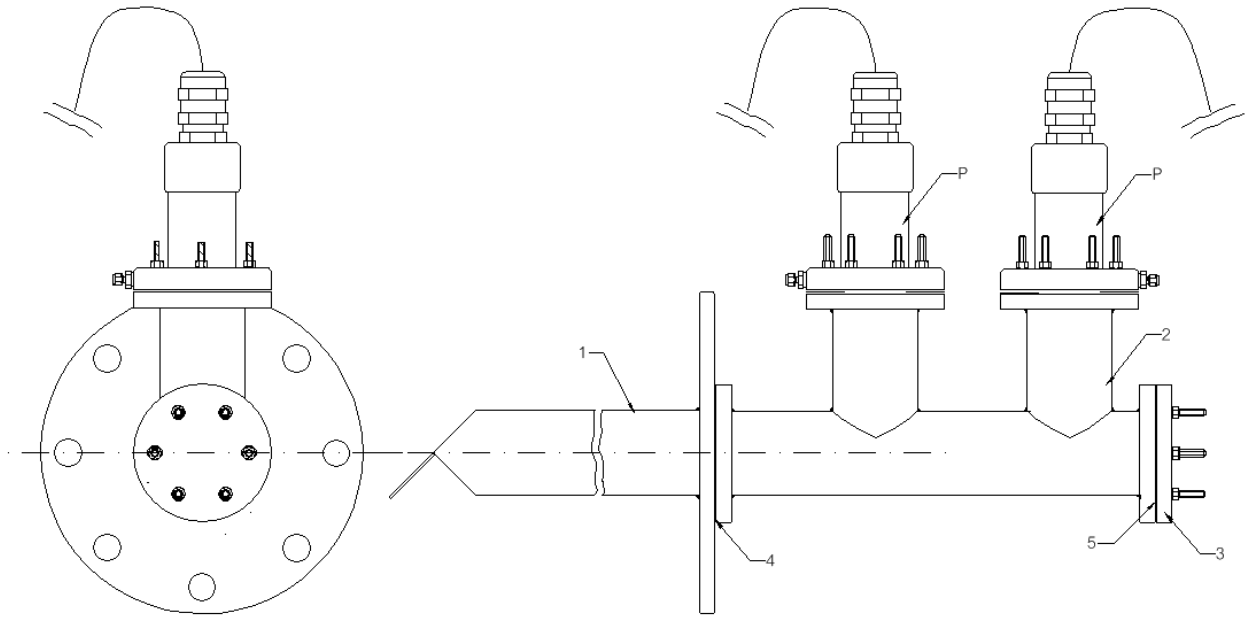
T-shape extensions prevent the probe from getting clogged by solid particles and from chemical deposits and condensates. It is thus very effective when used on dusty and/or corrosive applications. To limit condensation in the extension, it is often recommended to insulate it thermally.



1	Deflecting Tube	2	T-shape extension
3	Deflecting Sampling Tube	4	AT6000 Gasket
5	PF0298 : AT6000 Gasket 6 holes	P	ZR Probe

> EXTENSION FOR ANALYZER DUO

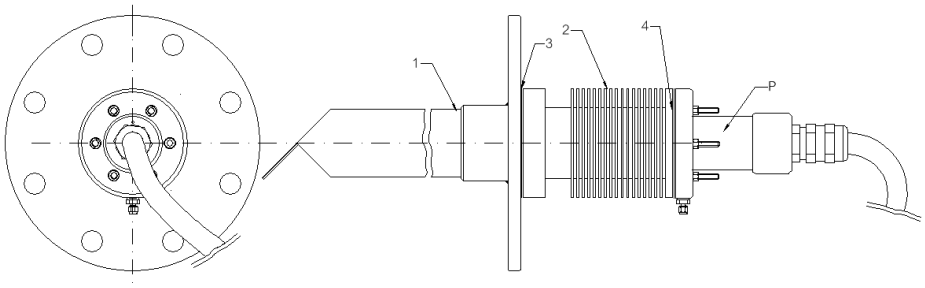
Extensions for analyser duo enable installation of two probes on one single mating flange. It has the same benefits as T-shape extensions.



1	Deflecting Tube	2	T-shape extension for 2 probes
3	Deflecting Sampling Tube	4	AT6000 Gasket
5	PF0298 : AT6000 Gasket 6 holes	P	ZR Probe

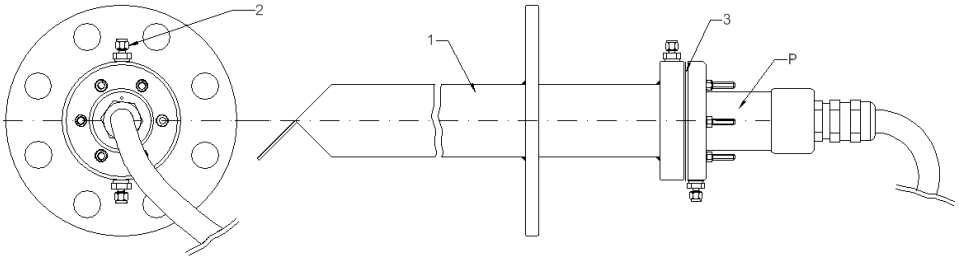
> COOLING EXTENSION

Cooling extensions are used on very high temperature application to limit the temperature of the probe. Generally it is installed on high temperature KANTHAL tubes.



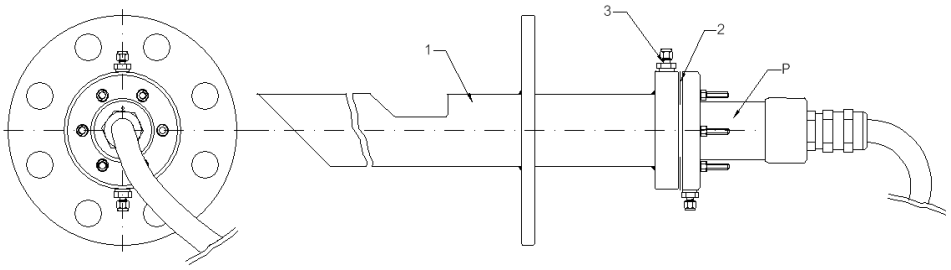
> FLOW BOOSTER

When the flue gas flow rate is too low, the pressure difference generated by the deflecting tube may not be sufficient to create a good circulation of flue gas inside the tube. In such case, the flow can be accelerated by injecting pressured air into the tube.



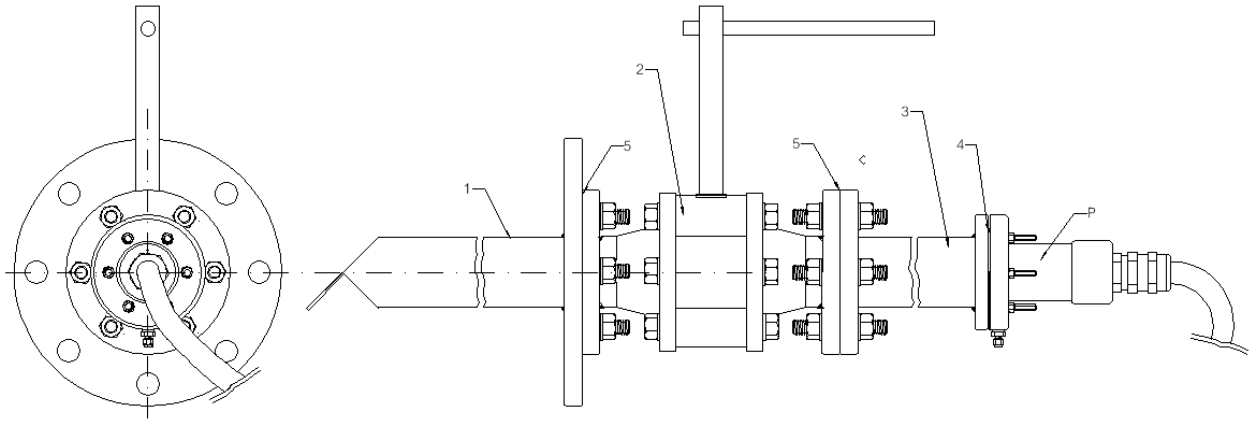
> FRONT FLOW SAMPLING

When the flue gas flow comes frontally to the mating tube, adapted deflecting tube must be used. Specific design enables flue deflection in this peculiar installation configuration.



> SECTION VALVE

On toxic or dangerous applications, full stainless steel section valves can be installed on deflecting tubes. Probes can be isolated from the flue gas flow for maintenance operations.



TUBE SPECIFICATIONS

SAMPLING PRINCIPLE	Spontaneous deflection by pressure difference	**APPLICATION**	In situ O2 % measurement in Combustion Flue Gas for process control
TUBE OD	60,3mm / 2"NB SCH10		
MEASURED GAS T°	120 to +1500ºC depending on deflecting tube material and shape	**MEASURED GAS PRESSURE**	–3 to +3kPa (–306 to +306mmH2O)
TUBE LENGTH	300mm to 2m	**TUBE MOUNTING**	Horizontal plane to +45º (nose down)
STANDARD FLANGES DIMENSIONS	4''150#RF	**PRESSURED GAS INLET**	Φ6mm double ferrule or Φ1/4"NPT-F connector (as specified)
WEIGHT	approx.. 10kg depending on tube length and flange size	**FINISH**	Raw Metal
COMPATIBLE PROBE	ZR PROBE type "ZR PROBE" and "ZPF2"	**STORAGE CONDITIONS**	Sensing element: –20 to +70ºC Flow Guide Tube: –10 to +100ºC

ORDERING INFORMATION

Please refer to RB-Technologies team for ordering this product

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