

## Complete Stack Sampling Systems & Accessories

Stainless Steel Probes, Nozzles, & Flanges



### HI-Q is ready to help with your stack sampling requirements:

State and Federal nuclear regulatory agencies require a stack discharge sampling program as part of the licensing process. Radionuclides discharged to the air in the form of particulate and volatile compounds must be assayed. Therefore, nuclear facilities are required to follow standard protocol for sampling their effluent. Possible emission of radionuclides to the general public has to be monitored in a systematic and acceptable manner. In the United States, the United States Environmental Protection Agency (USEPA) has the authority over such matters, and the current requirements and guidelines for sampling in nuclear stacks and ducts are laid down in **ANSI N13.1 1999**.

The sampling requirements are such that a system has to be designed for the collection of 10µm aerodynamic diameter (AD) particles. This size has been chosen, keeping in view that any effect of an emission on the public's health, is restricted to the respirable mass it contained. Sampling of an effluent for gases, poses fewer problems compared to that of particulate. Therefore a system capable of successfully sampling 10µm

AD particles will also be sufficient for sampling effluent gases.

In particle sampling, the challenges are many fold: 1) to aspirate particles from the stack flow into a sampling probe without bias, 2) to deliver those particles at the probe exit without any appreciable loss on the inner surfaces of the probe, 3) to further carry the particles through a transport line to a detection and analysis station without incurring additional losses and 4) to successfully analyze the sample and fulfill requirements, such as, raising an alarm (if needed) and/or to keep inventory of the release. According to the ANSI

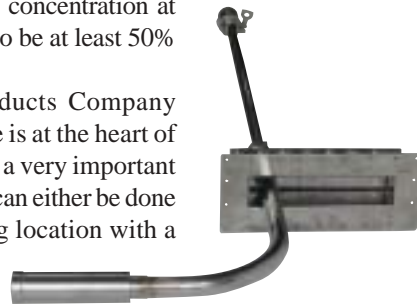


**Non-Obstructing  
1 1/2" dia. In-Line  
Sample Inlet**

N13.1 1999 standard, the particle concentration at the detection/analysis station has to be at least 50% of that in the free stream.

HI-Q Environmental Products Company considers that the sampling probe is at the heart of the whole sampling system and is a very important design component. The sampling can either be done at multiple points at the sampling location with a rake of un-shrouded, sharp-edged, probes operated

isokinetically or at a single point with a shrouded probe operated either non-isokinetically or isokinetically. The probe performance is the criterion to decide which type of sampling has to be used. For single-point sampling it has to be ensured that the uniformity of particle concentration has reached an acceptable limit at the sampling location, and that the correct type of shrouded probe is being used. For multiple-point sampling, the system has to be carefully evaluated to find out if it can achieve the acceptable performance as mentioned in ANSI N13.1 1999. The sample transport line has to meet the ANSI requirements as well.



### Complete Stack Sampling Systems

- Real-Time Monitoring
- Sample Collection for Analysis
- Mass Flow Control
- Iso-Kinetic Sampling Systems
- Custom Design

### Stainless Stack Sampling Components

- Shrouded Probes
- Single Point Probes
- Multi Point Particulate Probes
- Multi Point Gas Sampling Probes
- Slotted Sampling Probes
- Flanges
- Transport Lines
- Precision Machined Nozzle Tips

### Stack Sampling Design Standards

- ANSI N13.1 1999
- ANSI N13.1 1969
- EPA
- NESHAPS

### The following is a brief description of common stack sampling components:

<b>Flanges:</b>	Corrosion resistant stainless steel flanges or bulkhead plates are available for round or rectangular stacks, vents, or ducts.
<b>Probes &amp; Nozzles:</b>	The probe can be single point, slotted, multiple point gas, or multipoint particulate depending on the size and configuration of the stack, vent, or duct.
<b>Stack Flow:</b>	We have a complete line of air velocity gauges and monitoring devices available to meet your needs. From multi-point pitot tubes to thermal anemometer systems.
<b>Sample Flow:</b>	A range of systems can be used, from a simple venturi flow meter with a manual control valve to mass flow measuring and control systems with digital displays for instantaneous flow rate and accumulated total.
<b>Pump Systems:</b>	Many standard systems are found throughout our catalog but special designed systems are available for stack/fume hood sampling as well. Multi-sampling-point tank systems and dual, flip-flop pump systems are available.
<b>Instrument Weather Houses:</b>	Our instrument weather houses are designed to house pumps and instruments in an outdoor area. They are the industry standard and have proved to be very durable with their baked on polyurethane painted finish. NEMA rated enclosures are also available.

## Ordering Information

HI-Q Environmental Products Company's product line includes complete sampling systems, consisting of either type of probe, the transport line, sampling pump and flow controller. We recommend, design, and supply complete systems. HI-Q Environmental Products Company is able to make stack-sampling systems design suggestions by receiving your sampling requirements and operating conditions. *System design begins by providing HI-Q with the following information:*

1. Stack Flow Rate or Range: (i.e. 35,000 CFM)
2. Sample Point Stack Dimensions: (i.e. 36" Dia. Stack)
3. Sampling flow rate: (i.e. 50 LPM)
4. Sample Collection Media: (i.e. 47 mm diameter Glass Fiber)
5. Location of analysis station with respect to the sampling location: (i.e. distance, layout etc.)

## Stainless Steel Sampling Flanges

For Round Stacks or Ducts

Part Number	Stack Diameter	Probe Diameter
<b>SSFLNG-50-XX</b>	-XX	1/2"
<b>SSFLNG-75-XX</b>	-XX	3/4"
<b>SSFLNG-100-XX</b>	-XX	1"
<b>SSFLNG-125-XX</b>	-XX	1 1/4"
<b>SSFLNG-150-XX</b>	-XX	1 1/2"

- XX=Exact Outer Diameter of Round Stack/Duct
- Add "-M" to P/N for Multi-Point Probe Applications
- Add "-S" to P/N for Shrouded, Single Point, or Gas Probe Applications

## Single Point & Gas-Only Point Stainless Steel Sampling Probes (without nozzle)

HI-Q precision bends stack and fume hood-sampling probes from stainless steel tubing. Precision-machined nozzle tips may be added from the "Custom Machined Stainless Steel Sampling Nozzles" section. Single-point particulate probes are custom manufactured to customer specifications. Multipoint Gas Probes are custom designed to customer specified stack dimensions.

Order XX = length after 90°	Tube OD	Min Bend Radius (5 X Tube OD)
<b>SS-PG50-XX</b>	1/2"	N/A
<b>SS-P50-XX</b>	1/2"	2 1/2"
<b>SS-P75-XX</b>	3/4"	3 3/4"
<b>SS-P100-XX</b>	1"	5"
<b>SS-P125-XX</b>	1 1/4"	6 1/4"
<b>SS-P150-XX</b>	1 1/2"	7 1/2"

- "-XX" Tube Run after 90° Bend or Exact Stack dimensions for Gas Probe applications

## Custom Machined Stainless Steel Sampling Nozzles

HI-Q precision machines stainless steel nozzle tips. The slip dimensions are based on standard stainless steel tubing. Specify the nozzle tip opening upon ordering by replacing the "XXX" in the order number.

Order (XXX=Tip Opening)	TUBE OD	Nozzle Tip Opening Range
<b>SS-25NOZ-XXX</b>	1/4"	0.025" to 0.194"
<b>SS-50NOZ-XXX</b>	1/2"	0.125" to 0.444"
<b>SS-75NOZ-XXX</b>	3/4"	0.250" to 0.680"
<b>SS-100NOZ-XXX</b>	1"	0.375" to 0.930"
<b>SS-125NOZ-XXX</b>	1 1/4"	0.750" to 1.180"
<b>SS-150NOZ-XXX</b>	1 1/2"	0.875" to 1.430"

- "-XXX" = Tip Opening

For Rectangular Stacks or Ducts

Part Number	Minimum Flat Surface Area	Probe Diameter
<b>SSFLNG-50</b>	49 square inches	1/2"
<b>SSFLNG-75</b>	64 square inches	3/4"
<b>SSFLNG-100</b>	64 square inches	1"
<b>SSFLNG-125</b>	64 square inches	1 1/4"
<b>SSFLNG-150</b>	64 square inches	1 1/2"

- Add "-M" to P/N for Multi-Point Probe Applications
- Add "-S" to P/N for Shrouded, Single Point, or Gas Probe Applications

## Multi-Point Stainless Steel Sampling Probes

HI-Q designs and manufactures multi-point stainless steel probes meeting ANSI-N13.1 guidelines. Multi-Point probes are custom designed to meet the end users needs.

Order XX = length after 90°	MAIN TUBE OD	Min Bend Radius of each point (5 X Tube OD)
<b>SS-P50-XX-P</b>	1/2"	2 1/2"
<b>SS-P75-XX-P</b>	3/4"	3 3/4"
<b>SS-P100-XX-P</b>	1"	5"
<b>SS-P125-XX-P</b>	1 1/4"	6 1/4"
<b>SS-P150-XX-P</b>	1 1/2"	7 1/2"

- "-XX" = Tube Run after 90° Bend
- "-P" = Number of sampling points (drops)

## Stainless Steel Shrouded Probe Selection

Single Point Shrouded Probe selection is based on a range of Stack Velocities & Sample Flow Rates. Choose the correct shrouded probe from the table below:

Probe Designation	Nominal Sampling Rate, LPM	Velocity Range (m/s) for which $0.8 \leq Td \leq 1.3$
<b>RF-2-111</b>	57 (2 CFM)	0 to 24
<b>RF-3-111</b>	85 (3 CFM)	1 to 25
<b>RF-2-112</b>	57 (2 CFM)	0 to 16
<b>RF-3-112</b>	85 (3 CFM)	1 to 25
<b>RF-2-113</b>	57 (2 CFM)	0 to 5