

GENERAL DESCRIPTION

The Universal Analyzers Model 1221 series distillation sample probes are a unique self-cleaning and temperature stabilized primary sample conditioning system for demanding on-line gas analysis applications.

The 1221 and 1221R solve the key issues compromising plant and furnace performance by improving measurement accuracy and reliability. The self-cleaning separator condenses heavy components in the sample and washes them back into the process along with any deposited solids avoiding the regular 'plugging' that occurs with conventional conditioning systems. Maintenance is also simplified, once isolated from the main-line, the separator can be serviced without the need to remove the probe assembly.

The 1221 and 1221R use a multiple-stage cooling design which is made entirely of 316SS. Multiple stage cooling provides efficient removal of entrained liquids due to its high surface area and the thermal efficiency of our patented TraceBoost® technology.

This high-performance probe is ideal for use in applications such as ethylene effluent and decoke analysis as well as FCCUs. The unique reflux design minimizes the effect of changing ambient and process temperatures as it cools the sample and simultaneously removes particulates, liquid, and high boiling-point compounds. The 1221 and 1221R ensure high-accuracy analyzer performance and protection against liquid carry-over. The electronic controller includes self-diagnostics, local and remote monitoring displays, configurable fail-safe alarms, and optional DCS integration, which eliminate the need for regularly scheduled maintenance.

Applications

- Ethane and Naphtha Cracking Furnaces (ethylene, propylene and ratio measurement)
- Decoke Operations (CO measurement)
- Fluidized Catalytic Cracking Units (FCCU)
- Syngas

Typical Installations

- Ethylene Effluent
- Decoke headers
- Hot, wet or dirty process gases
- Pyrolysis gases
- Heavy particulate removal

FEATURES

Temperature Control

- Pneumatic
- Electronic - local
- Electronic - remote

Heat Transfer

- Proprietary Insulation
- Consistent and Reliable Outlet Temperature

Air Consumption

- TraceBoost® Design

Spine Technology

- Replaceable in field
- Self Cleaning reflux action



Pat. Pending

"We've completely eliminated liquid reaching the GC and reduced our routine maintenance from a monthly occurrence to once a year at turn around."
Customer feedback from a large petrochemical customer



1221 Distillation Sample Probe

Specifications

- Process contacting parts: 316 SS.
- Inlet flange available in most sizes, ratings and specifications.
- Weight: 1221 - 150 lbs (68 kg), 1221R - 120 lbs (55 kg).
- Max process pressure and temperature determined by connecting flange specified.
- Ambient temperature: 32° to 158°F (0 to 70°C) with pneumatic controller / -65° to 140°F (-55 to 60°C) with electronic controller
- Sample outlet: 1/4", 3/8", 6mm or 8mm tube
- Suitable for: Class I, Div. 2, A, B, C, D or Zone 2 Group A, B, C
- Sample inlet, outlet, and coolant temperature monitoring with the electronic controllers
- All data available from the on board electronic controllers via Modbus RTU and TCP/IP
- Probe sample gas flow rate: 2 - 10 LPM based on ambient and process conditions.
- Sample outlet temperature: ± 1°C (2°F) with electronic controllers (± 3°C - ±5°F with pneumatic)

Supply Requirements

- Electronic Controller: user configurable for 24 VDC or 110/240 VAC 50/60 Hz
 Power consumption: 6.4A @ 24 VAC
 1.3A @ 110 VAC
 0.8A @ 230VAC)
- Instrument Air (-40°C/F dewpoint)
 40 scfm @ 80-100 psi (68 m³/hr @ 5.5 - 6.9 bar)
 80 scfm @ 80-100 psi (134 m³/hr @ 5.5 - 6.9 bar) for dual vortex option

		Air Consumption scfm (m ³ /hr)				
		40 scfm (68 m ³ /hr) Vortex Tube Duty Cycle % Time on				
		20%	40%	60%	80%	100%
Pressure psi (bar)	80 (5.5)	384 (10.9)	768 (21.7)	1152 (326)	1536 (43.5)	1920 (54.4)
	90 (6.2)	432 (12.2)	864 (24.5)	1296 (36.7)	1728 (48.9)	2160 (61.2)
	100 (6.9)	480 (13.6)	960 (27.2)	1440 (40.8)	1920 (54.4)	2400 (68.0)

1221 Distillation Sample Probe

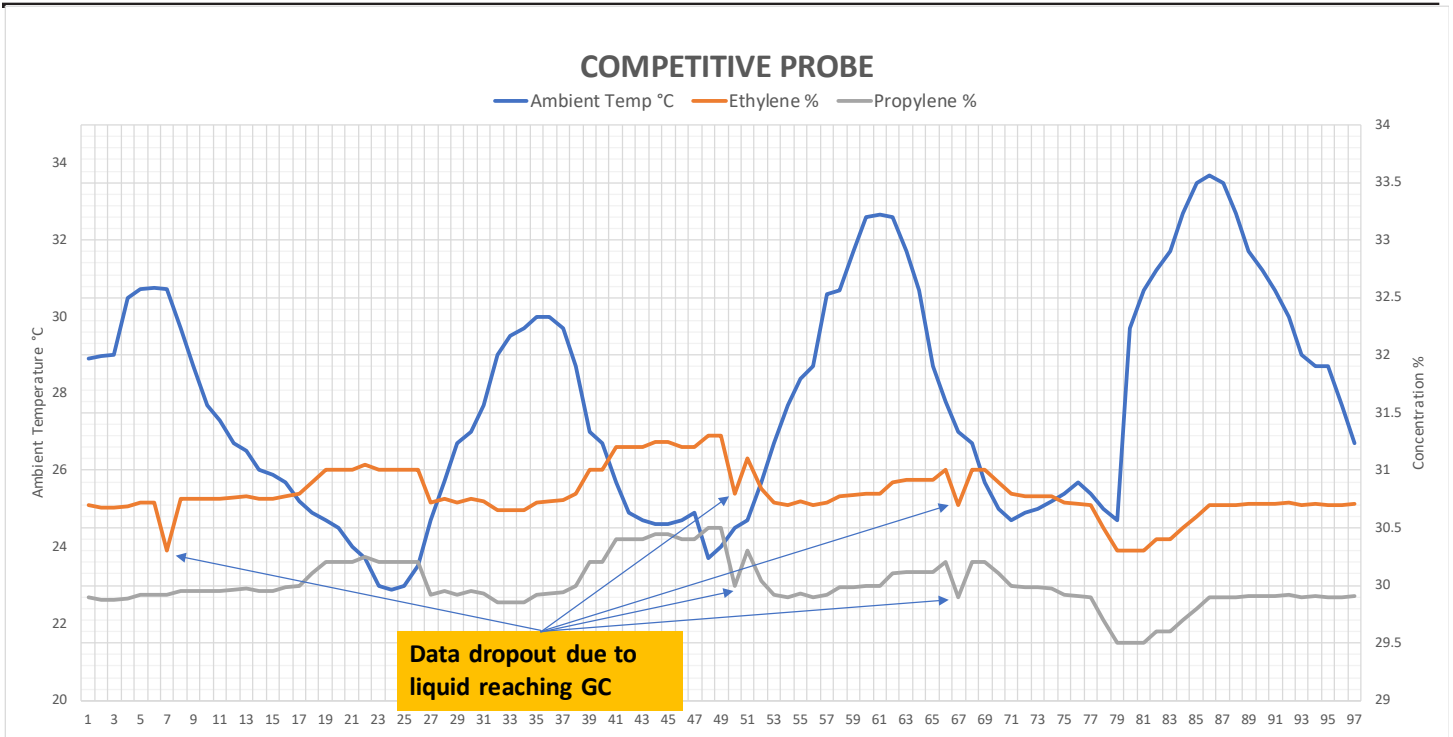


FIGURE 1 – RESULTS FROM COMPETITORS DISTILLATION SAMPLER
10.8°C Ambient Temperature Range from Average of 27.7°C
1% variance in Ethylene concentration
1% variance in Propylene concentration

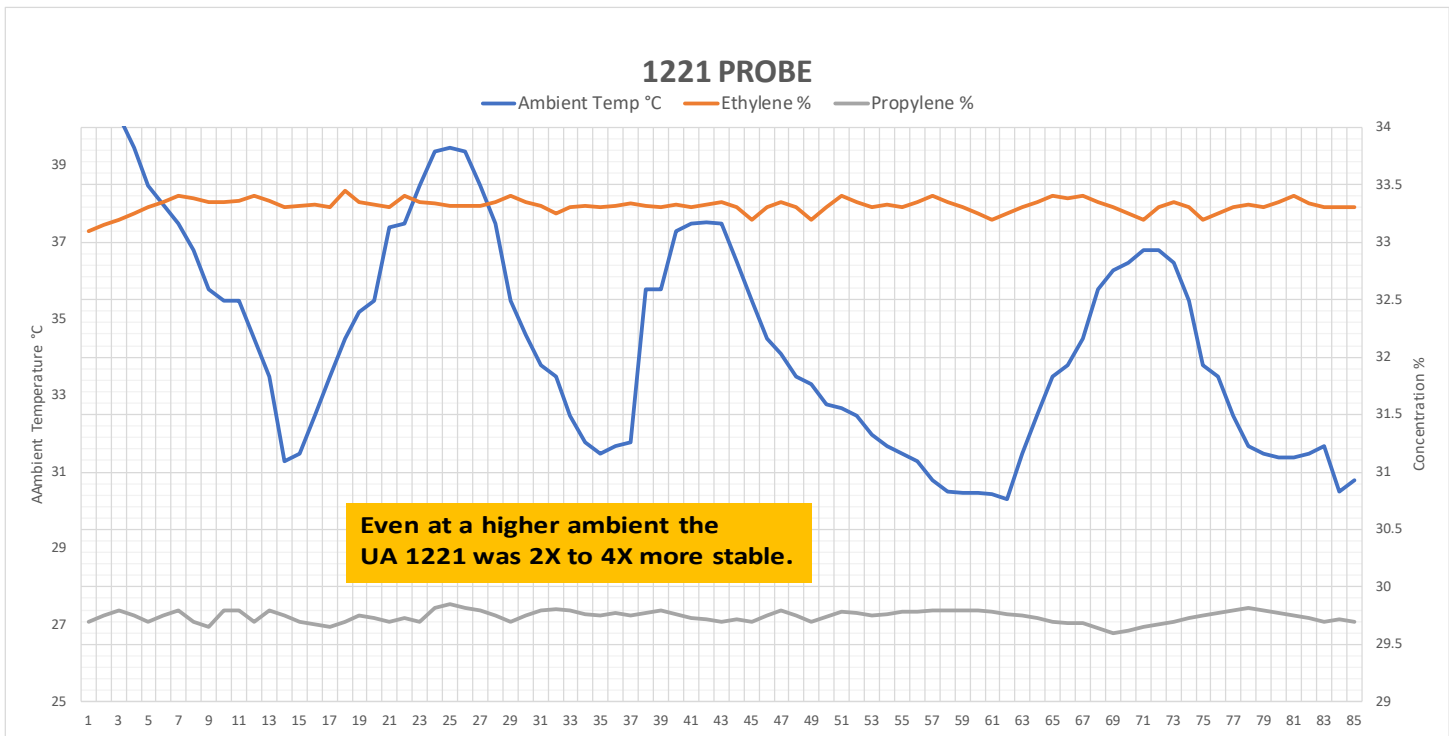


FIGURE 2 – RESULTS FROM Model 1221 DISTILLATION SAMPLER
10.2°C Ambient Temperature Range from Average of 34.5°C
0.5% variance in Ethylene concentration
0.25% variance in Propylene concentration

1221 Distillation Sample Probe

Selection and Configuration

- Mounting restrictions:
Flange size, space and weight limitations.
Each unit requires a minimum of 12" clearance / 300mm above the unit for maintenance.
- Determine required cooling capacity:
Sample flow rate?
% water in sample?
Inlet temperature?
Control/outlet temperature?

- Select cooling media:

Instrument Air 80 psi (5.5 bar) minimum. 40 cfm (68 m ³ /hr) minimum	Water Maximum inlet temperature 50°F (10°C)	Process Fluid Consult factory
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- Sample transport bundle configured and supplied separately

- Control options:

Pneumatic

Control ± 3°C / 5°F
Cooling media: Instrument air only
Ambient temperature:
32 - 158°F
0 - 70°C

Electronic Local

HMI Display: LED 2.5"/65mm x 4 lines of text
Power: 24VDC, 120VAC or 240VAC

Electronic Remote (Sold separately)

Multiple units mounted in a single enclosure
May be panel mounted or mounted in a separate user supplied enclosure.
HMI Display Options:
LED 2.5"/65mm lines of text
or
LED 12.5"/320mm with data logging and trending
Communication requires control bundle from controller to unit.

Body Size	
1221	Nominal height 55" / 1.4M - 1/4" and 3/8" sample outlet connections
1221R	Nominal height 35" / 0.9M - 1/4" and 3/8" sample outlet connections
Chamber Material	
S	316 Stainless Steel
Mounting Flange Size (DN flanges available)	
F2-150	2" 150# Flange
F2-300	2" 300# Flange
F25-150	2-1/2" 150# Flange
F25-300	2-1/2" 300# Flange
F3-150	3" 150# Flange
F3-300	3" 300# Flange
Control	
LC	Local controller (14 to 131°F / -10°C to 55°C ambient temperature)
LH	Local controller with enclosure heater (-65° to 131°F / -55 °C to 55°C ambient temperature)
RC	External remote controller (-40 to 140°F / -40 to 60°C ambient temperature)
RH	External remote controller with enclosure heater (65° to 140°F / -55 °C to 60°C Ambient temperature)
PA	Pneumatic controller with automated shut-off (32 to 158°F / 0°C / 70°C ambient temperature)
Cooling Method	
V	Single vortex air cooler (40 scfm / 68 m ³ /hr)
V2	Dual vortex air coolers for Decoke and >35% water (80 scfm / 134 m ³ /hr)
L	Liquid cooler (must use LC, LH, RC or RH controller)
Disc Configuration	
STD	Standard 316 Stainless Steel
Bundle/Cable Entry	
2	2" boot for heated sample line 0.75 - 1.6"/19 - 40mm diameter
3	3" boot for heated sample line 1.38 - 2.75"/35 - 70mm diameter
N	None
EX Option	
EX	Changes design standards to IEC Zone 2

Additional Options	
1221-STEAM-300	Steam port flush with hand valve for separator. 50 psi (3.5 bar) saturated steam maximum
1221-006M	Conversion kit to 6mm sample outlet connection
1221-008M	Conversion kit to 8mm sample outlet connection