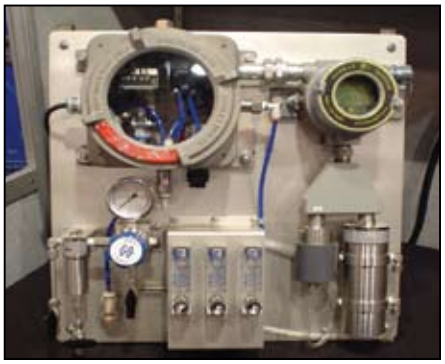
Sample Conditioning / Filtration Systems

MAP Application Solutions

Background

There are many requirements throughout refineries, petroleum and chemical facilities where sample analysis is critical to the operation and production output. Sample analysis instrumentation are adversely effected by condensed contaminants, gas bubbles and solid contaminants both of which can also skew the analysis output. Efficient removal of undesirable contaminants from a sample stream will ensure accurate analysis and trouble-free operation of the instrumentation.



Application

Typical applications for sample filtration include stack gas or emissions sampling, on-line process analyzers, effluent stream sampling, natural gas analysis and ambient air analysis. These sampling applications all have specific and unique filtration requirements depending on the analysis to be performed. Quantitative measurement of solids (capture and retention of solids) is unique to stack and exhaust gas sampling.

Slipstream or bypass sampling (high flow, short lag time) is used extensively for product quality analysis. Coalescing filtration is used widely in most sampling applications to protect analyzers from condensables.

Requirements for sample filters range so widely that specifying a filter is best done on a case by case basis. There is one generalization that applies to all sample filter requirements: the filter must be able to efficiently separate a non-continuous phase contaminant from the continuous sample stream phase. In addition to removing solid particles, the filter specifically must be able to remove liquid droplets in gas samples and to remove immiscible liquid droplets and gas bubbles in liquid samples. Most filter media will do an adequate job of removing solid particles from liquids or gases, but the only practical commercial media that will separate liquids from gases, gas bubbles from liquids and two immiscible liquids is glass microfiber media with a coalescing matrix design.

Case Study

Process analytical instrumentation such as gas chromatographs, liquid chromatographs, atomic adsorption instruments, fourier transform infrared spectrometers, ion analyzers and chemical composition analyzers are routinely found throughout most production areas of a facility. Although miniaturization and enhanced ruggedness is designed into these instruments, analytical precision, accuracy and consistency remain the primary concern. A key factor that causes difficulty in obtaining increasingly precise qualitative and quantitative data from online process analyzers is in proper sample conditioning.

Parker Balston offers filtration systems that are specifically designed for sample conditioning. There are over 100 filter housings and filter media specifically designed to handle most all sampling requirements. Capabilities include pressure ranges up to 5000 psig with temperature ranges from -300°F to 900°F. Filtration efficiencies range from 0.22 micron to 100 microns in liquid streams and 0.01 to 100 microns in gaseous streams. Hardware is offered in a wide array of materials from anodized aluminum to PTFE, stainless steel and monel.

Recognized as the industry leader in sample filtration and conditioning, Parker Balston sample filtration systems are found in the majority of all instrument and analyzer sheds and as a supplied component with most process instrumentation packages.

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Miniature Filter Housings and Convienient T-type Filters

Features and Benefits

- Remove liquids and solids from gas samples
- Remove solids and gas bubbles from liquid samples
- Coalesce and separate two liquid phases
- Filter solids and liquids from gases with 99.999% efficiency at 0.01 micron
- Temperature resistance to 900°F (482°C)
- Low pressure drop
- Long life between filter element changes

Model 95S6

Model 105S6

Models 91S6, 95A, 95M 95S6, 95T, 105S6

These models are miniature T-type filters constructed of 316 stainless steel (5000 psig), PTFE (150 psig), and other specialty materials. With only 19 ml internal volume and the opportunity for by-pass or slipstream filtration using the drain port as an exit port, the model 95 filters are ideal sample filters for on-line analyzers. The model 105S6 has a small internal volume of 15 ml, which is ideal for applications requiring fast sampling response time.

Principal Specifications & Ordering Information

Model	105S6	91S6	95A	95M	95S6	95
Inlet &	1/8" NPT	1/8" NPT	1/8" NPT	1/8" NPT Outlet Ports (1)	1/8" NPT	1/8" NPT
Drain Port	1/8" NPT	1/8" NPT	1/8" NPT	1/8" NPT	1/8" NPT	1/8" NPT
Materials of Contruction						
Head	316 SS (2)	316 SS (2)	Aluminum	Monel	316 SS (2)	PTFE
Bowl	316 SS (2)	316 SS (2)	Aluminum	Monel	316 SS (2)	PTFE
Internals	316 SS (2)	316 SS (2)	Aluminum	PTFE	316SS (2)	PTFE
Seals	Viton	Viton	Viton	Viton	Viton	PTFE/Viton
Max. Temp.	400°F (204°C)	400°F (204°C)	200°F (93°C)	400°F (204°C)	400°F (204°C)	300°F (149°C)
Max. Press. (3)	5000 psig	1500 psig	2500 psig	5000 psig	5000 psig	150 psig
Ship Wt.	1 lb (0.4 kg)	1 lb (0.4 kg)	0.5 lb (0.2 kg)	1 lb (0.4 kg)	1 lb (0.4 kg)	0.5 lb (0.2 kg)
Dimensions	1.8"Dx3.3"L (4cm x 8cm)	1.5"Dx3.7"L (3.8cm x 9.4cm)	1.8"Dx3.3"L (4cm x 8cm)	1.8"Dx3.3"L (4cm x 8cm)	1.8"Dx3.3"L (4cm x 8cm)	1.8"Dx3.3"L (4cm x 8cm)

Model	Support Core	Filter Cartridges	Use These Filter Types
105D6	Included	050-07-❑	Q, H
91S6	Included	050-11-❑	Q, H
95A	Included	050-11-❑	Q, H
95M	Included	050-11-❑	Q, H, M
95S6	Included	050-11-❑	Q, H, M
95T	Included	050-11-❑	Q, H, M

1 Also available with 1/4" NPT ports. To order with 1/4" NPT ports, use designation Model 95S6-1/4, etc.

2 Constructed of materials which comply with NACE Specification MR-01-75. Request certificate of compliance.

3 Max. pressure ratings are for temperatures to 200°F (93°C). Please consult factory for maximum pressure ratings at elevated temperatures.

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Fast Loop Filters
Filtration Efficiency from
100 micron to 0.01 micron

Model 41GCFL-1/4

Model 48S6

Model 49S6

Models 31, 41, 48, 49

Balston fast loop filters are constructed of 316 stainless steel with an optional stainless steel bowl or pyrex bowl. This flow through design continuously flushes the filter cartridge carrying the contaminates back out to the process stream, thus maximizing the filter cartridge life. The low flow sample stream pulled into the analyzer is filtered to ranges of 100 micron to 0.01 micron (depending on the filtration efficiency required). Two designs are available: the T-type design is suitable for high flow, high volume applications. The in-line design is ideal for heavily contaminated applications.

Axial velocity flushes the bulk contaminants through the filter housing back to the process stream. The sample stream passes through the filter cartridge wall with low flow and radial velocity. The clean side of the sample filter system has very low volume which minimizes lag time. A four to one flow rate is recommended to realize the benefits of prolonged filter cartridge life associated with continuous flushing.

Principal Specifications & Ordering Information

Model	31GCFL -1/4	31S6CFL -1/4	41GCFL -1/4	41S6CFL -1/4	48S6	49S6
Inlet & Outlet Ports	1/4" NPT	1/4" NPT	1/4" NPT	1/4" NPT	1/4" NPT	1/2" NPT
Drain Port	1/4" NPT	1/4" NPT	1/4" NPT	1/4" NPT	----	----
Materials of Contruction						
Head	316 SS	316 SS (2)	316 SS	316 SS (2)	316 SS (2)	316 SS (2)
Bowl (1)	Pyrex	316 SS (2)	Pyrex	316 SS (2)	316 SS (2)	316 SS (2)
Internals	316 SS	316 SS (2)	316 SS	316 SS (2)	316SS (2)	316 SS (2)
Seals	Viton	Viton	Viton	Viton	Viton	PTFE/Viton
Max. Temp.	160°F (71°C)	400°F (204°C)	160°F (71°C)	400°F (204°C)	400°F (204°C)	400°F (204°C)
Max. Press. (2)	100 psig	425 psig	100 psig	250 psig	5000 psig	1500 psig
Ship Wt.	2 lbs (0.9 kg)	3 lbs (1.4 kg)	4 lbs (0.2 kg)	5 lbs (2.3 kg)	1.1 lbs (0.2 kg)	2.5 lb (0.4 kg)
Dimensions	2.2"Dx5.5"L (5.7cmx14cm)	2.2"Dx5.5"L (5.7cmx14cm)	2.2"Dx10"L (5.7cmx25cm)	2.2"Dx10"L (5.7cmx25cm)	1.35"Dx4"L (3.2cmx10cm)	1.9"Dx7"L (4.8cmx17.8cm)

Model	Support Core	Filter Cartridges	Use These Filter Types
31GCFL-1/4	SS-100-12	100-12-❑	XE, H, Q, M
31S6CFL-1/4	SS-100-12	100-12-❑	XE, H, Q, M
41GCFL-1/4	SS-100-25	100-25-❑	XE, H, Q, M
41S6CFL-1/4	SS-100-25	100-25-❑	XE, H, Q, M
48S6	Included	050-11-❑	XE, H, Q, M
49S6	---	100-185-❑	XE, H, Q

1 Maximum pressure ratings are for temperatures to 200°F (104°C). Please consult factory for maximum pressure ratings at elevated temperatures.

2 Constructed of materials which comply with NACE Specification MR-01-75. Request certificate of compliance.

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