aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Balston Filters and Dryers for Hospitals

Eliminate Stained Instruments by Controlling Steam Quality

Parker Balston

ENGINEERING YOUR SUCCESS.

Parker Hannifin Corporation

The Global Leader in Motion and Control Technologies

We engineer success of our customers around the world, drawing upon nine core motion and control technologies. These technolgies enable virtually every machine and process to operate accurately, efficiently and dependably.

As the global leader in motion and control, we partner with our distributors to increase our customers' productivity and profitability by delivering an unmatchable breadth of engineered components and value-added services.

We continue to grow with our customers by creating application-focused products and system solutions. A key to our global expansion has been to follow our customers and establish operations, sales and service wherever they are needed. No single competitor matches Parker's global presence.

Corporate Headquarters in Cleveland, Ohio.

Parker's Motion and Control Technologies

Aerospace	Hydraulics
Climate Control	Pneumatics
Electromechanical	Process Control
Filtration	Sealing & Shielding
Fluid & Gas Handling	

Legal Notifications

WARNING

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Parker Balston

Balston Filters for Sterilizers

Eliminate Stained Instruments by Controlling Steam Quality

Solve Instrument Staining and Wet Packs, Reduce Sterilizer Maintenance

Product Benefits:

Extensive hospital experience has shown that the Balston Steam Filter essentially eliminates instrument staining, spotting, and rusting caused by wet or dirty steam. Other benefits obtained by use of the Balston Steam Filter include:

- Reduction in wetting of sterilizer articles. Wrapped articles emerge from the sterilizer cycle drier as well as cleaner.
- Significant reduction in staining of sterilizer interiors. Expensive and time-consuming cleaning is greatly reduced or eliminated.
- Reduction in maintenance of sterilizer steam control valves, door seals, and other rubber materials in the sterilizer.

Sterilized with Balston Steam Filter

Sterilized without Balston Steam Filter

The Problems:

Dirty Steam

- Stained Instruments
- Wet packs
- Dirty sterilizers
- Malfunctioning steam valves

Dirty Water

- Deposits and stains on instruments
- Tarnishing and staining of sterilizer
- Increased sterilizer maintenance

The Solutions:

Balston Type 23R Steam Filter

- Completely removes rust and dirt from steam
- Reduces carrryover of boiler feedwater chemicals
- Helps to eliminate wet packs by removing excessive condensate in the steam

Balston LP-20 Water Filter

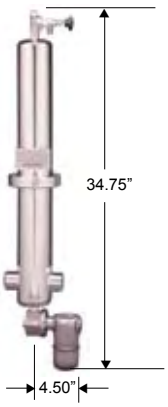
- Single stage filter removes all harmful solids from even the dirtiest water supplies
- Filter cartridge life more than three months
- Can be used on hot or cold water lines

Balston Steam Filters

Types 23/75R

Type 23R Steam Filter: What it is, How It Works

The Balston Type 23R Steam Filter contains a patented Microfibre® Filter Tube in a rugged stainless steel housing especially designed for steam service. Included as standard items with the Type 23R are a stainless steel condensate drain and high quality bleeder valve. The unit, as received, is complete , ready for installation. The filter is installed in the hospital steam line immediately upstream of the sterilizer control valve (refer to drawing below).



Type 23R

As shown in the cutaway drawing, steam enters the housing into an expansion chamber, where much of the condensate is knocked out of the steam by the abrupt change in flow direction and velocity. The steam then flows upward in the housing, through the Grade R Microfibre Filter Tube and then downward to the exit port. The Grade R Microfibre Filter Tube, rated at 98+% efficiency for 0.1 micron and larger particles, removes essentially all the suspended solid particles and the remaining water droplets. The water draining from the filter tube and the expansion chamber is automatically removed from the housing by the automatic condensate drain.

The Balston Grade R Microfibre Filter Tube, the heart of the Type 23R Filter, combines rugged construction with remarkably efficient filtration of solid particles and liquid droplets. Solid particles remain trapped in the depth of the filter tube, while liquid water drips from the filter tube to the automatic drain. The Microfibre Filter Tube is constructed from chemically inert borosilicate glass fibers and fluorocarbon resin binder. The filter tube is completely free of impurities which could extract into the steam.

Recommended Steam Filters

The Type 23/75R Steam Filter is recommended for use on 3/4” and 1” steam lines, the line sizes for the vast majority of hospital sterilizers. For recommendations on filters for larger steam lines, please consult the Parker Technical Support Department at 800-343-4048 or email at balstontechsupport@parker.com.

Ordering Information

For assistance call toll free at 800-343-4048, 8AM to 5PM EST

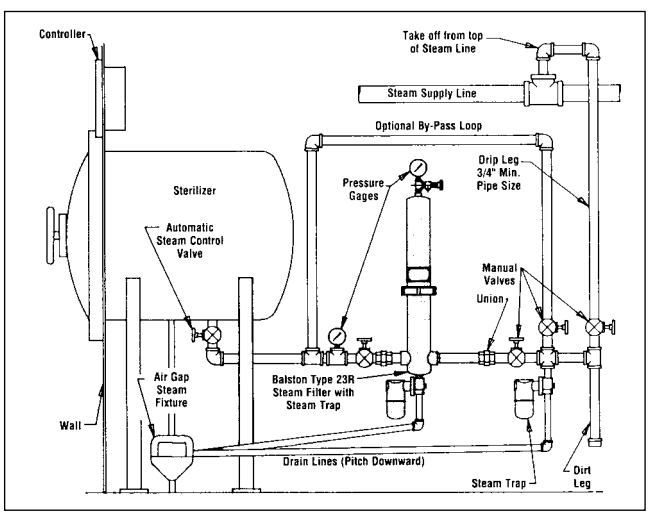
Steam Line Size	Filter
1/2”, 3/4”, 1”	Type 23/75R

Installation and Recommendations

The filter is shipped completely assembled, filter element installed, ready to tie into your steam line. The recommended installation drawing shows the recommended method for installing the Type 23R Filter. Inlet and outlet ports are 1” NPT for the Type 23/75R. Since the filter weighs only 16 pounds, it can easily be supported by the steam line. No mounting bracket is required.

The filter should be installed on the upstream (pressure) side of the sterilizer steam control valve, as close as possible, to minimize condensation and pipe scale downstream of the filter. It is good practice to insulate the Type 23R housing (up to the external compression ring) and the steam piping downstream of the filter to prevent condensation between the filter and the sterilizer.

Iron pipe should be replaced with non-corroding pipe (stainless steel) downstream of the filter to prevent additional contamination. Parker Hannifin recommends one Type 23R on each sterilizer steam line. Please consult a Parker application engineer if any other arrangement is being considered.



Changing Filter Tubes

Since the Type 23R is installed upstream of the sterilizer steam control valve, it is exposed to steam at full line pressure at all times, regardless of the sterilizer operating schedule. Therefore, the filter tube should be changed every six weeks, whether or not the sterilizer has been used frequently during that period. If the filter tube is allowed to remain in service considerably longer than six weeks, the resin binder in the tube may weaken and the tube will no longer filter at its initial efficiency. Filter tube life is based on steam pressure of 50 psig or less. Tube life will be shorter at higher pressures. A tag on which the date of each filter tube change may be written is attached to the Type 23R.

How to Change the Filter Tubes

Note: Service person must wear insulated gloves.

To change a filter tube, shut off the steam valve and vent the steam from the housing by opening the bleeder valve slowly. Loosen the external compression ring, using the spanner wrench supplied with each housing. Lift off the bowl of the filter. Unscrew the element retainer and remove it from the tie rod. Pull the used filter tube off the support core. Slide the new filter tube down on the support core and screw the element retainer onto the tie rod . Replace the bowl and tighten the external compression ring with the spanner. Close the bleeder valve. Approximately 5 minutes is required to change the filter tube.

Write the date of the filter tube change on the date tag attached to the housing.

Note: Each time a filter tube is changed, spread a light coat of lubricant on the rubber sealing ring and on the threads of the metal compression ring. A new seal, lubricant and date tag are included with each box of 15 replacement tubes.

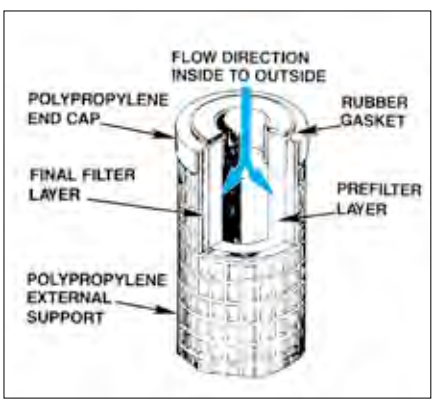
Balston Water Filters

LP-20, 53/50, 53/95

Filtering Water with the Balston LP-20 Filter

Dirt and rust in the hot or cold water supply to washer-sterilizers leave deposits and stains on valuable instruments and on sterilizer interiors. In most hospitals, the cleanliness of the water depends upon the efficiency of the municipal water treatment system. Excessive dirt in the water can be an on-again, off-again problem caused by drought, a fire in the neighborhood, water main problems, or scores of other random events well beyond the control of the hospital engineers. This unpredictable, expensive problem can easily be solved, permanently, by installing an inexpensive and easily maintained Balston LP-20 water filter on the water feed to the washer-sterilizer. On any washer-sterilizer, the Balston Type 23R filter on the steam line plus an LP-20 filter on the water line guarantees freedom from outside contaminants.

The LP-20 Filter Cartridge - How it Works



The LP-20 Filter Cartridge is constructed entirely from inert, safe polypropylene. The thick filter wall is composed of self-bonded polypropylene filters, graded from coarse to fine in the direction of flow (inside-to-outside), with polypropylene end caps. Since the coarse inner fiber layer serves as a prefilter for the fine outer layer, the life of the filter cartridge is exceptionally long. Over 50,000 gallons of water can be filtered by a single 20" cartridge on even the dirtiest water supply. The all-polypropylene construction qualifies the LP-20 cartridge for use on hot water (up to 180°F) as well as cold water. Since the LP cartridges contain no glues, wetting agents, or other chemicals, they produce no extractables in water.

How to Select the Correct LP-20 Filter - Easily

Use the Type 53/95 or Type 53/50 polypropylene housing with the LP-20 filter cartridge. Simply match the water line size to the appropriate filter housing.

Please refer to page 4 for detailed information on filter housings.

Ordering Information - Recommended Filter Housings

For assistance call toll free at 800-343-4048, 8AM to 5PM EST

With these recommendations, the expected life of an LP-20 cartridge will be 3 months or more.

Water Line Size	Recommended Filter Housing and Cartridge
3/4"	Type 53/95 with LP-200-95-20
1/2"	Type 53/50 with LP-200-50-20

Balston Water Filters

Specifications and Ordering Information

Type 53/50 and 53/95

These models are all-polypropylene, designed for a single filter cartridge in 10” and 20” lenghts. The Type 53 housings are used for cold water service only.

Type 53/50 Type 53/95

Installation and Recommendations

The filter housing for the LP-20 cartridge should be installed on the cold water line as close to the sterilizer inlet as possible. It is ideal to mount a pressure gauge on both sides of the filter housing to monitor the pressure drop across the filter cartridge. The filter cartridge should be replaced when the pressure drop across the housing, as read on the two pressure gauges when the water is flowing, exceeds 15 psi. Since the filter will withstand a pressure drop in excess of 60 psi, there is no danger in leaving the filter cartridge in line with higher than 15 psi pressure drop, but the sterilizer cycle time may be lengthened.

To change the filter cartridge, close the shutoff valves on either side of the filter housing and vent the pressure; when both pressure gauges read zero remove the filter bowl by hand. No tools are required. Allow about three minutes for the replacement.

Please note that for best results it is necessary to filter both the steam and the water supplies to a washer-sterilizer. Please refer to page 2 for information on specifying a steam filter.

Principal Specifications

Water Filter Shipping Wt (lbs.)	Port Size	Materials of Construction (NPT)	Head	Bowl	Internals	Seals	Max. Temp. (°F)	Max. Press (psig)	Max. Diff. Pres. (psig) (1)
53/50	3/4”	Polypro.	Polypro.	Polypro.	–	EPR	125	125	60
53/95	3/4”	Polypro.	Polypro.	Polypro.	–	EPR	125	125	60

Ordering Information - Recommended Filter Housings

For assistance call toll free at 800-343-4048, 8AM to 5PM EST

Type	Filter Cartridge (2) Number Required	Box of 3	Box of 10
53/50	1	LP-3/200-50-20	LP-200-50-20
53/95	1	LP-3/200-95-20	LP-200-95-20

Notes:

1 Inside-out flow. LP Filter Cartridge.

2 Filter Cartridge not included with housing and must be ordered separately.

Compressed Air and Gas Filters

for Hospital Applications

Balston® Stainless Steel Compressed Air and Gas Filter Assemblies

Protect your equipment and instruments from the dirt, water, and oil usually found in compressed air and other gases. These filters will remove contaminants at a very high efficiency - up to 99.9999+% for 0.01 micron particles and droplets. Liquid releases from the filter cartridge to an automatic drain as rapidly as it enters the filter. This allows the filter to continue removing liquids for an unlimited time without loss of efficiency for flow capacity. The Balston Grade SA Filter Media is designed to remove all bacteria and viable organisms. Select 1/4" to 1" line filters are constructed of 304 stainless steel and are designed to hold up to washdown chemicals.

Product Features:

All 304 stainless steel construction, ideal standing up to aggressive washdown chemicals

Remove 99.9999+% of 0.01 micron particles of oil, water, rust and scale from compressed air and other gases

Removes all viable organisms for sterile air requirements

Low pressure drop

Continuously trap and drain liquids

Remove trace oil vapor with adsorbent cartridges

Compressed Air and Gas Filters

for Hospital Applications

Filter Cartridge Description

General purpose applications such as plant compressed air	Single stage filtration. Use a Grade DX filter cartridge
Instrument air and other critical air requirements	Two stage filtration is necessary. Use a Grade DX followed by a Grade BX filter cartridge. As a general rule, a Grade BX filter cartridge should not be used alone.
Removal of trace compressor oil vapor	For rare instances where even a trace amount of oil vapor can cause a problem, three stage filtration is necessary. Use a Grade DX followed by a Grade BX, and a type CI cartridge
Sterile Air	Removal of all viable organisms and bacteria

Physical Properties, Microfibre Filter Cartridges

Temperature Range	-150°F to 300°F (-100°C - 149°C)
Maximum Pressure Differential Across Filter, Inside-to-Outside Flow:	100 psi
Materials of Construction	Borosilicate glass microfibers with fluorocarbon resin binder. Resistant to water, all hydrocarbon and synthetic lubricants.

Retention Efficiency

Grade	**Efficiency for 0.01 Micron Particles and Droplets**
DX	93%
BX	99.99%
SA	99.9999+%

Balston Filter Cartridges

Balston provides two grades of coalescing filter cartridges, Grade DX and Grade BX. Singly or in tandem, these filters satisfy all requirements for removing liquid and solid contaminants from compressed air. Balston also has an activated carbon adsorbent CI-type cartridge for the removal of trace oil vapors from a compressed air line. The activated carbon cartridge is Grade 000.

How to Select the Filter Cartridge and Housing

1. Decide which grade(s) of filter cartridges fits the application (see selection boxes at left).
2. Select the filter housing with a port size equal to the line size where the filter is to be located.
3. For a new installation in which the line size has yet to be selected, determine the gas flow rate and pressure at the point where the filter will be located, and then refer to the flow chart on the reverse side of this data sheet. NOTE: The filter port size must be equal to or larger than the line size (when specified).

How to Order the Filter Assembly

1. Build your own custom filter assembly using the guideline matrix on Page 7 and specify your model number. Example: 1/2” filter with DPI and Auto Drain with Grade DX Filter = 6004N-DX.
2. Each assembly is shipped with the filter cartridge installed. To order additional filter cartridges, indicate the model number of the cartridges, and the grade. Examples 050-05-DX, 050-05-BX. The grade used for Type CI cartridges is 000 (CI-100-12-000).

Note: Assemblies with CI Cartridges are shipped with the adsorbent cartridge wrapped separately. This shipping method prolongs the life of the cartridge.

Compressed Air and Gas Filters

for Hospital Applications - 1/4" to 1" Line Size

Model 6002, 6904

The 6002 series models are 1/4" line size filters designed for lower flow systems and installations with space limitations. It is offered with two drain options, a manual drain or an auto float drain for maintenance free operation. The model 6904 offers 1/2" inlet and outlet connections. For applications requiring 1/2" pipe with space limitation requirements.

Model 6004

The 6004 series models are 1/2" line size filters designed for moderate flow rate systems. This series has increased liquid holding capacity which safeguards sensitive end use points from system upsets and morning start ups.

Model 6006 and 6008

The 6006 and 6008 series models are 3/4" and 1" line size filters respectively. These are designed for high flow rate systems servicing multiple end use points. These are also offered with a high capacity auto float drain option.

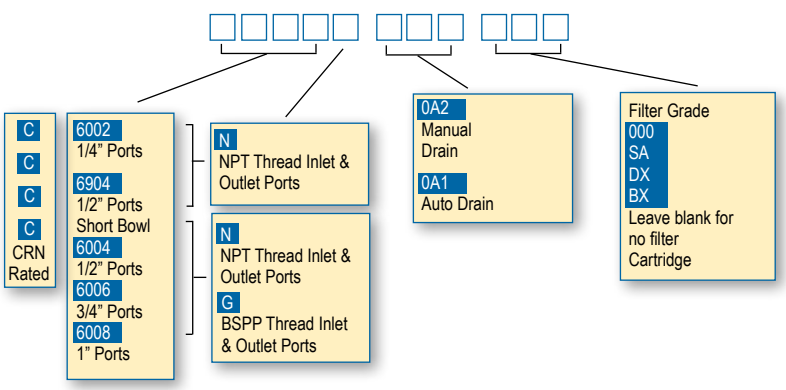
Model 6002, 6904 Model 6004

Models 6006 and 6008

How to Order the Filter Assembly*

Build your own custom filter assembly using the guideline matrix below and specify your model number. Example: 1/2" filter with Auto Drain and Grade DX Filter = 6004N-0A1-DX.

***Consult Factory. Not all configurations are available.**



Compressed Air and Gas Filters

for Hospital Applications - 1/4" to 1" Line Size

Flow Rates

Filter Housing Model	Port Size	Filter Cartridge Grade	Flow rates (SCFM), at 2 psi drop at indicated line pressure. Refer to Principal Specification Charts in each product data sheet for maximum pressure rating of each housing PSIG								
			2	20	40	80	100	125	150	200	250
6002N 6904N	1/4" 1/2"	DX	9	19	39	51	63	76	90	117	145
		BX	3	8	11	21	25	31	36	47	58
		CI	2	5	7	12	15	18	22	28	35
		SA	---	8	11	21	25	31	36	---	---
6004N	1/2"	DX	19	41	65	113	137	166	196	257	316
		BX	9	19	30	51	63	76	90	117	145
		CI	6	12	19	32	39	48	56	73	90
		SA	---	19	30	51	63	76	90	---	---
6006N	3/4"	DX	37	78	123	214	259	315	371	484	596
		BX	10	21	34	56	70	85	101	131	162
		CI	8	16	26	44	53	65	76	99	122
		SA	---	21	34	56	70	85	101	---	---
6008N	1"	DX	55	115	181	314	380	463	546	711	877
		BX	11	23	37	64	77	94	111	144	178
		CI	10	20	32	56	67	82	96	125	154
		SA	---	23	37	64	77	94	111	---	---

Sterile Air Filters

Balston grade SA filter cartridges, rated at 99.9999+% efficiency for 0.01 micron particles, is at least 30 times better than the accepted standard for sterile air filters developed by independent research organizations in the U.S. and U.K. (request bulletin TI-105A for a detailed discussion on Balston filter efficiency rating procedure, and Bulletin TI-935 for an independent test report on Sterile Air Filters). Balston Sterile Air Filters are in full compliance with the requirements of the FDA.

Steam Sterilization Procedure

In installations where the sterile air filter requires steam sterilization, we recommend the following procedures:

The steam sterilization pressure should not exceed 60 psig. Preferably, it should be held to 40 psig or less. A typical sterilization cycle is 30 psig steam for 30 minutes. Steaming time can be increased as desired without harm to the filter cartridges. The steam flow should not exceed the normal air flow for the unit. To ensure no buildup of condensate in the housing, condensate should be drained from the filter by a condensate drain valve during the steaming process. The cleanliness of the steam is an important factor influencing the life of the Sterile Air Filter cartridges. Parker strongly recommends using Model 23 Steam Filters to ensure optimum operating life. When autoclaving, the Grade SA filter cartridges will tolerate temperatures to 300°F (149°C) in dry gas. Viton or other heat resistant seals should be used in the housing.

Compressed Air and Gas Filters

for Hospital Applications - 1/4" to 1" Line Size

Principal Specifications

Model	6002	6904	6004	6006	6008
Port Size	1/4" NPT	1/2" NPT	1/2" NPT	3/4" NPT	1" NPT
Materials of Construction					
Head	304 Stainless Steel	→	→	→	→
Bowl	304 Stainless Steel	→	→	→	→
Internals	Stainless Steel	→	→	→	→
Seals	Buna-N Food Grade	→	→	→	→
Maximum Temperature (1)	120°F (49°C)	→	→	→	→
Maximum Pressure (2)	175 psig	→	→	→	→
Minimum Pressure (3)	15 psig	→	→	→	→
Shipping Weight	3.5 lbs.	3.5 lbs.	4.0 lbs.	11 lbs.	12 lbs.
Dimensions	3"W X 7"L (7mm X 18mm)	3"W X 7"L (7mm X 18mm)	3"W X 10"L (7mm X 25mm)	4"W X 10"L (10mm X 25mm)	4"W X 12"L (10mm X 30mm)

Notes:

1 Max. temperature with auto drain Max. temperature with manual drain is 275°F.

2 Max. pressure with auto drain. Max. pressure with manual drain is 250 psi.

3 Required for proper operation of auto drain.

Ordering Information **For assistance, call toll-free at 1-800-343-4048 8AM to 5PM Eastern Time**

Assembly Ordering Information (4)

Model P/N	Filter Tube	Drain (Manual)	Drain (Auto. Float)	Mounting Bracket (stainless steel)
6002N-0A2-(?X)	100-12-(?X)	A03-0178	N/A	C01-0094
6002N-0A1-(?X)	100-12-(?X)	N/A	A03-0179	C01-0094
6002N-0A2-SA	100-12-SA	A03-0178	N/A	C01-0094
6002N-0A2-000	CI-100-12-000	A03-0178	N/A	C01-0094
6904N-0A2-(?X)	100-12-(?X)	A03-0178	N/A	C01-0094
6904N-0A2-(?X)	100-12-(?X)	N/A	A03-0178	C01-0094
6904N-0A2-SA	100-12-SA	A03-0178	N/A	C01-0094
6904N-0A2-000	CI-100-12-000	A03-0178	N/A	C01-0094
6004N-0A2-(?X)	100-18-(?X)	A03-0178	N/A	C01-0094
6004N-0A1-(?X)	100-18-(?X)	N/A	A03-0179	C01-0094
6004N-0A2-SA	100-18-SA	A03-0178	N/A	C01-0094
6004N-0A2-000	CI-100-18-000	A03-0178	N/A	C01-0094
6006N-0A2-(?X)	200-176-(?X)	A03-0178	N/A	C01-0094
6006N-0A1-(?X)	200-176-(?X)	N/A	A03-0179	C01-0094
6006N-0A2-SA	200-176-SA	A03-0178	N/A	C01-0094
6006N-0A2-000	200-176-000	A03-0178	N/A	C01-0094
6008N-0A2-(?X)	200-185-(?X)	A03-0178	N/A	C01-0094
6008N-0A1-(?X)	200-185-(?X)	N/A	A03-0179	C01-0094
6008N-0A2-SA	200-185-SA	A03-0178	N/A	C01-0094
6008N-0A2-000	200-185-000	A03-0178	N/A	C01-0094

(4) Use a "C" prefix to order models with CRN rating

Replacement Filter Cartridge Ordering Information

Model P/N	6002	6004	6006	6008
Replacement Filter Cartridges				
Number required	1	1	1	1
Box of 2	2/100-12-(?X)	2/100-18-(?X)	2/200-176-(?X)	2/200-185-(?X)
Box of 5	5/100-12-(?X)	5/100-18-(?X)	5/200-176-(?X)	5/200-185-(?X)
Box of 10	100-12-(?X)	100-18-(?X)	200-176-(?X)	200-185-(?X)
Box of 2	2/100-12-SA	2/100-18-SA	2/200-176-SA	2/200-185-SA
Box of 10	100-12-SA	100-18-SA	200-176-SA	200-185-SA
CI Cartridges (box of 1)	CI100-12-000	CI100-18-000	CI200-176-000	CI200-185-000

Compressed Air Dryers

Balston Compressed Air Dryers

Balston Membrane Air Dryers combine superior coalescing technology with a proven, innovative membrane system to supply clean, dry compressed air with dewpoints as low as -40°F (-40°C).

Each dryer is delivered complete and ready for easy installation.

Applications:

Pure, low dewpoint air to storage cabinets

HVAC systems and controls

-40°F dewpoint pure air to linear accelerators - exceeds ISA 7.0.-1-1966 Standard

Critical pneumatically operated equipment

Compressed air supplies to outdoor applications

Sprinkler systems

Utility compressed air to labs and instruments

Protect electrical cabinets from condensation

Product Features:

- Unattended 24 hour operation
- Compact
- No moving parts, no electricity required
- Silent operation
- No desiccant to change
- Easy to install and operate

Photo courtesy of Varian Medical Systems of Palo Alto, California. Copyright © 2009; all rights reserved.

Pure Air to Linear Accelerators

Compressed Air Dryers

Membrane Air Dryers

Balston Membrane Air Dryers combine a superior coalescing technology with a proven, innovative membrane system to supply clean, dry compressed air with dewpoints as low as -40°F (-40°C). The Membrane Air Dryers are engineered for easy installation, operation, and long term reliability. The dryers incorporate high efficiency coalescing filtration and the highest efficiency membrane available to provide low cost operation and minimal maintenance.

Applications

- Low dewpoint instrument air
- Pneumatic equipment
- Pressurizing electronic cabinets
- Analytical instrumentation
- Prevention of freeze-ups
- Dry air for hazardous areas
- General laboratory air supply
- Protect electrical panel components from moisture damage
- Linear accelerators
- Instrument air
- Dry blow off air
- Drying of instruments and tubing

Water vapor from the compressed air supply passes through the hollow fibers of the membrane. At the same time, a small portion of the dry air product is redirected along the length of the fibers to sweep out the water vapor laden air which has permeated the membrane. The moisture-laden sweep gas is then vented to the atmosphere, and clean, dry air is supplied to the application. The drying power of the membrane is controlled by varying the compressed air flow rate and pressure. The Balston Membrane Air Dryer is designed to operate continuously, 24 hours per day, 7 days per week. The only maintenance required is changing the prefilter cartridge twice a year. This semi-annual maintenance takes approximately 5 minutes.

Balston
Membrane Air Dryers

Product Features:

- Offer a reliable, efficient, and economical alternative to pressure swing and refrigerant dryer technologies
- Require no electricity thus lowering operating costs
- Dewpoints as low as -40°F (-40°C)
- prevent freeze-ups
- Explosion proof
- Silent operation
- No desiccant to change

Compressed Air Dryers

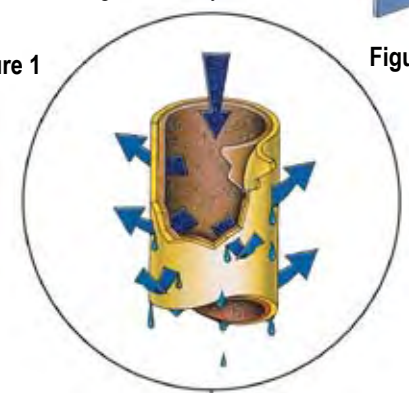
Membrane Air Dryers

Membrane Air Dryer - Principle of Operation

Captive 'O' Rings
- less need for spares

Dual layer filter element
- long life and high efficiency

Figure 1



Phase I - Coalescing

Simple Construction - economical consumables and kinder to the environment

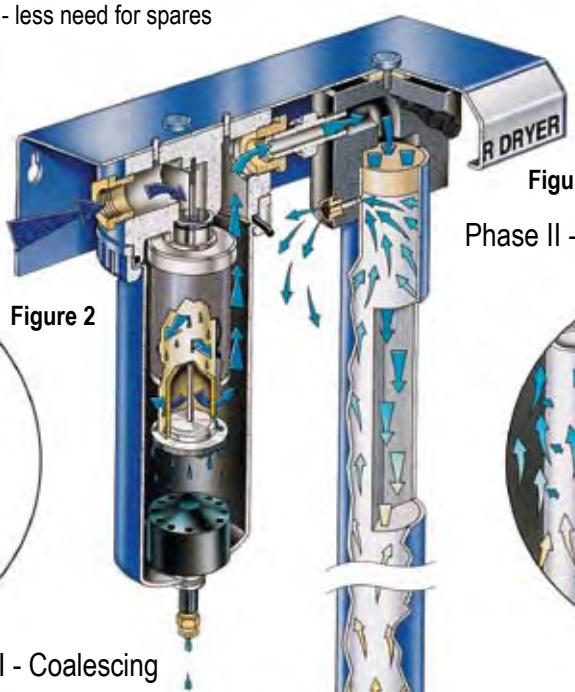


Figure 2

Figure 3

Phase II - Air Drying

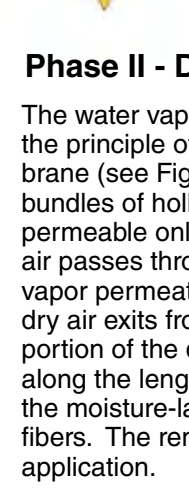


Figure 5

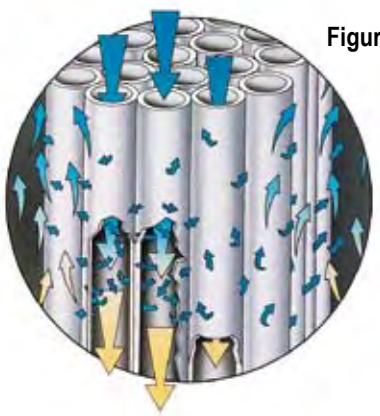


Figure 4

Hollow microfibers

Phase I - Coalescing Filtration

Prior to entering the membrane drying module, the compressed air passes through a high efficiency coalescing filter to remove oil and water droplets and particulate contamination with an efficiency of 99.99% at 0.01 micron. The liquids removed by the filter cartridge continuously drip from the filter cartridge into the bottom of the housing, where they are automatically emptied by an autodrain assembly (see Fig. 1 and Fig. 2). The air leaving the prefilter, therefore, is laden only with water vapor, which will be removed in the membrane module.

Phase II - Drying

The water vapor in the compressed air is removed by the principle of selective permeation through a membrane (see Fig. 3). The membrane module consists of bundles of hollow membrane fibers (see Fig. 4), each permeable only to water vapor. As the compressed air passes through the center of these fibers, water vapor permeates through the walls of the fiber, and dry air exits from the other end of the fiber. A small portion of the dry air (regeneration flow) is redirected along the length of the membrane fiber to carry away the moisture-laden air which surrounds the membrane fibers. The remainder of the dry air is piped to the application.

Compressed Air Dryers

Membrane Air Dryers for -40°F Dewpoint

Model 76-01

Model 76-02

Model 76-10

Model 76-20

Model 76-40

Flow Rates

Outlet Flow (SCFM) at Indicated Operating Pressure (psig) for -40°F (-40°C) Atmospheric Dewpoint

Pressure Dewpoint	60 psig -40°F(-40°C)	80 psig -40°F(-40°C)	100 psig -40°F(-40°C)	120 psig -40°F(-40°C)	140 psig -40°F(-40°C)
Model 76-01	.3	.6	1	1.3	1.7
Model 76-02	.6	1	2	2.4	3.4
Model 76-10	3.0	5	10	13	17
Model 76-20	6.0	10	20	26	34
Model 76-40	12.0	20	40	52	68

Membrane Module Regeneration Flow

Regeneration Flow (SCFM) at Indicated Operating Pressure (psig) and all dewpoints

Pressure Dewpoint	60 psig	80 psig	100 psig	120 psig	140 psig
Model 76-01	.2	.2	.3	.3	.3
Model 76-02	.34	.4	.5	.6	.7
Model 76-10	1.7	2.1	2.5	3	3.3
Model 76-20	3.4	4.2	5	6	6.6
Model 76-40	6.8	8.4	10	12	14

Compressed Air Dryers

Membrane Air Dryers for -40°F Dewpoint

Principal Specifications

Model	76-01	76-02	76-10	76-20	76-40
Max. Flow Rate At -40°F (-40°C) Dewpoint (1)	1 SCFM	2 SCFM	10 SCFM	20 SCFM	40 SCFM
Min/Max Inlet Air Temp. (2)	40°F/120°F (4°C/49°C) →				
Ambient Temp. Range	40°F - 120°F (4°C - 49°C) →				
Min/Max Inlet Pressure	60 psig/150 psig →				
Compressed Air Requirement	Total Air Consumption: Regeneration Flow + Outlet Flow Requirements (see tables on pg.166)				
Max. Pressure Drop (3)	5 psid	5 psid	5 psid	5 psid	5 psid
Wall Mountable	Yes	Yes	Yes	Yes	Yes
Prefilter (included) (4)	Yes	Yes	Yes	Yes	Yes
Inlet/Outlet Port Size	1/4" NPT (female)	1/4" NPT (female)	1/2" NPT (female)	1" NPT (female)	1 1/2" NPT (female)/ 3/4" NPT (female)
Electrical Requirements	None	None	None	None	None
Dimensions	6"W x 22"H x 5"D (15cm x 58cm x 13cm)	6"W x 23"H x 5"D (15cm x 58cm x 13cm)	6"W x 37"H x 5"D (15cm x 94cm x 13cm)	12"W x 37"H x 7"D (30cm x 94cm x 18cm)	19"W x 39"H x 8"D (48cm x 99cm x 21cm)
Shipping Weight	9 lbs. (4 kg)	10 lbs. (5 kg)	18 lbs. (9 kg)	20 lbs. (9 kg)	35 lbs. (16 kg)

Notes:

1 Dewpoint specified for saturated inlet air at 100°F (38°C) and 100 psig. Outlet flows will vary slightly for other inlet conditions.

2 Inlet compressed air dewpoint must not exceed the ambient air temperature.

3 5 psid at -40°F (-40°C) dewpoint operating parameters.

4 If compressed air is extremely contaminated, a Balston Grade DX prefilter should be installed directly upstream from the membrane dryer.

Ordering Information

For Assistance, call toll-free at 1-800-343-4048 8AM to 5PM Eastern Time

Description	Model Number				
Balston Membrane Air Dryer	76-01	76-02	76-10	76-20	76-40
Replacement Prefilter Cartridges					
Box of 10	100-12-BX	100-12-BX	100-18-BX	150-19-BX	200-35-BX
Box of 2	2/100-12-BX	2/100-12-BX	2/100-18-BX	2/150-19-BX	2/200-35-BX
Optional Additional Coalescing Prefilter	2004N-1B1-DX	2004N-1B1-DX	2104N-1B1-DX	2208N-1B1-DX	2312N-1B1-DX
Replacement Filter Cartridges for Optional Prefilter					
Box of 10	100-12-DX	100-12-DX	100-18-DX	150-19-DX	200-35-DX
Box of 10	2/100-12-DX	2/100-12-DX	2/100-18-DX	2/150-19-DX	2/200-35-DX
Pressure Regulator (0-130 psig) 1/2" NPT Ports	72-130	72-130	72-130	-------	——

Compressed Air Dryers

IT Series Membrane Air Dryers for +35°F Dewpoint*

IT Series Membrane Dryers

There are many variables that will affect the output specification of compressed air. By the time air reaches all its intended area, changes in pressure and temperature can contribute to potential contamination. As capital equipment tolerances become tighter and more sensitive to this contamination, maintenance costs will escalate if equipment is not adequately protected. In cases where standard air filtration is not sufficient or where the reliability, performance and operating cost of older dryer technologies is becoming more significant, a Balston Membrane Dryer provides a reliable and economical alternative.

IT Series Point of Use Membrane Dryers

Balston Membrane Air Dryers combine superior coalescing filtration technology with a proven, innovative membrane system to supply clean, dry, +35°F dewpoint compressed air. If the house compressed air is equipped with a refrigerated dryer, the dewpoint drops to +15°F. The Balston Membrane Dryers are available in 8 different models which can deliver compressed air at flow rates up to 100 SCFM. dewpoint. The systems are engineered for easy installation, operation, and long term reliability. By incorporating high efficiency coalescing filtration and the highest efficiency membrane available, the systems provide low cost operation with the lowest minimal maintenance.

Product Features:

- **Offer a reliable, efficient, and economical alternative to pressure swing and refrigerant dryer technologies**
- **Require no electricity thus lowering operating costs**
- **Produce +35°F dewpoint, ideal for critical points of use**
- **Produce +15°F dewpoint in air systems with existing refrigerated air dryers**
- **No moving parts**
- **Silent operation**
- **No desiccant to change**

*** If the house compressed air is equipped with a refrigerated dryer, the dewpoint drops to +15°F.**

Compressed Air Dryers

IT Series Membrane Air Dryers for +35°F Dewpoint*

IT0010-35

IT0030-35

IT0080-35

IT0150-35

IT0250-35XX

IT0500-35XX

Easy to Operate and Maintain

Installation consists of simply connecting a standard compressed air line to the inlet and connecting the outlet to your application. The unit is ready for trouble-free operation. This system is designed to operate 24 hours per day, 7 days per week.

Once the system is operating, it requires little monitoring. The only maintenance involves changing the coalescing prefilter cartridges periodically. The membrane module does not require any maintenance.

Flow Rates

Model Number	IT0010-35	IT0030-35	IT0080-35	IT0150-35	IT0250-3560	IT0250-3500	IT0500-3560	IT0500-3500	IT1000-3560	IT1000-3500
Flow @ 100 psig Inlet Pressure (scfm)	1	3	8	15	25	N/A	50	N/A	100	N/A
Flow @ 101-150 psig Inlet Pressure (scfm)	1	3	8	15	N/A	25	N/A	50	N/A	100
Regeneration Flow @ 100 psig (scfm) (1)	0.25	0.5	1.5	2.7	4.5	4.5	9.0	9.0	18.0	18.0

(1) Total Air Consumption = Regeneration + Outlet Flow.

*** If the house compressed air is equipped with a refrigerated dryer, the dewpoint drops to +15°F.**

Compressed Air Dryers

IT Series Membrane Air Dryers for +35°F Dewpoint*

Principal Specifications

Model Number	IT0010-35	IT0030-35	IT0080-35	IT0150-35	IT0250-3560	IT0250-3500	IT0500-3560	IT0500-3500	IT1000-3560	IT1000-3500
Min/Max Inlet Air Temp.	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C
Min/Max Ambient Air Temp.	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C	40°F/120°F 4°C/49°C
Min/Max Inlet Pressure	60/150 psig 4.1/10 barg	60/150 psig 4.1/10 barg	60/150 psig 4.1/10 barg	60/150 psig 4.1/10 barg	60/100 psig 4.1/6.9 barg	100/150 psig 6.9/10 barg	60/100 psig 4.1/6.9 barg	100/150 psig 6.9/10 barg	100/150 psig 6.9/10 barg	100/150 psig 6.9/10 barg
Max. Pressure Drop (1)	3 psid	3 psid	3 psid	3 psid	5 psid	5 psid	5 psid	5 psid	5 psid	5 psid
Wall Mountable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mechanical Separator Included	F14F17B	F06F18B	F06F18B	F07F38B	F07F38B	F07F38B	F07F38B	F07F38B	F602-08WJR	F602-08WJR
Coalescing Prefilters (1)	8A02N-OB2-BX (2)	2002N-0B1-BX (2)	2002N-0B1-BX (2)	B2004N-1B1-DX B2004N-0B1-BX	2104-1B1-DX 2104-0B1-BX	2104N-1B1-DX 2104-0B1-BX	2208N-1B1-DX 2208N-0B1-BX	2208N-1B1-DX 2208N-0B1-BX	2208N-1B1-DX 2208N-0B1-BX	2208N-1B1-DX 2208N-0B1-BX
inlet Port Size	1/4" NPT	1/4" NPT	1/4" NPT	1/2" NPT	1/2" NPT	1/2" NPT	1/2" NPT	1/2" NPT	1" NPT	1" NPT
Outlet Port Size	1/4" NPT	1/4" NPT	1/4" NPT	1/2" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT
Electrical Requirements	None	None	None	None	None	None	None	None	None	None
Dimensions (cm)	17.5"Lx8"Wx2.5"D 44.5 x 20.3 x 6.3	18.1"Lx10"Wx4"D 45.2 x 10.5 x 6.3	24"Lx11.1"Wx4"D 61 x 28.2 x 6.3	25"Lx16"Wx4.5"D 63.5 x 40.6 x 11.4	26"Lx18"Wx6"D 66 x 45.7 x 15.2	26"Lx18"Wx6"D 66 x 45.7 x 15.2	39"Lx21"Wx6"D 99 x 53.3 x 15.2	39"Dx21"Wx6"D 99 x 53.3 x 15.2	47"Dx28"Wx7"D 119 x 71 x 18	47"Dx28"Wx7"D 119 x 71 x 18
Shipping Weight	1.62 lbs (.73 kg)	6.68 lbs (3 kg)	6.68 lbs (3 kg)	14.88 lbs (6.75 kg)	24.5 lbs (11.11 kg)	24.5 lbs (11.11 kg)	36.5 lbs (16.55 kg)	36.5 lbs (16.55 kg)	52 lbs (24 kg)	52 lbs (24 kg)

Notes:

1 If compressed air is extremely contaminated, a Grade DX prefilter should be installed directly upstream of the membrane dryer.

Ordering Information for assistance call toll free at 800-343-4048, 8AM to 5PM EST

Model Number	IT0010-35	IT0030-35	IT0080-35	IT0150-35	IT0250-3560	IT0250-3500	IT0500-3560	IT0500-3500	IT1000-3560	IT1000-3500
Replacement Prefilter Cartridges*										
Stage 1	PS403	PS702	PS702	PS802	PS802	PS802	PS802	PS802	EK602VB	EK602VB
Stage 2 **	---	---	---	5/100-12-DX	5/100-18-DX	5/100-18-DX	5/100-19-DX	5/150-19-DX	5/150-19=DX	5/150-19-DX
Stage 3	5/050-05-BX	5/100-12-BX	5/100-12-BX	5/100-12-BX	5/100-18-BX	5/100-18-BX	5/150-19-BX	5/150-19-BX	5/150-19-BX	5/150-19-BX

*** If the house compressed air is equipped with a refrigerated dryer, the dewpoint drops to +15°F.**

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Eliminating stained instruments by controlling steam quality

Steam supplied to hospital sterilizers, while biologically sterile, contains inorganic impurities, such as rust, pipe scale, etc., and condensed water, which also carries boiler feedwater additives. When these impurities are deposited on instruments, they cause stains. Wet steam, laden with condensed water causes wet packs and contributes to staining.

Removing these solid and liquid impurities in steam through the use of an efficient steam filter eliminates the problem of "sterile but stained" instruments and wet packs.

This article, which appeared in the authoritative "Journal of hospital supply, processing and distribution" provides readers with a practical and economical solution to the widespread problem of stained surgical instruments and wet packs.

For further information about Parker/Balston® Steam Filters or any other Parker/Balston® Microfibre® Filter Products, contact your local representative, or call or write:

Eliminating stained instruments by controlling steam quality

by Richard Strauss

Instruments stained by impurities in steam are a major problem in the OR and CS. Even though technically sterile, stained instruments are very often rejected by OR personnel. In fact, one famous New York hospital, on first encountering stains, thought they might be blood stains and actually took the instruments to the Medical Examiner only to find that the stains were caused by rust and dirt in the steam.

Not only are stained instruments an offense in the OR and an embarrassment in CS, they are expensive. Sending out stained instruments to be reconditioned is costly, and it also depletes the hospital's inventory of those instruments for the time it takes to recondition them. When a single load of surgical instruments in a sterilizer may be valued at $35,000, $50,000 or even more, it is not difficult to understand the need to prevent staining.

Most CS and biomedical personnel have come to recognize that the common phenomenon of stained surgical instruments from the steam sterilizer is caused not by imperfections of the instruments or malfunction of the sterilizer, but by the purity of the steam itself.

Steam is by definition sterile in the sense that it can contain no viable microorganisms. However, typical steam is far from "pure." It contains particles of rust, pipe scale and other particulate matter. It contains condensed water. It contains chemicals from boiler feedwater additives. It is the action of these impurities on instruments that causes staining.

In a typical hospital, sterilizing consumes but 3-5% of the total steam made by the system. The rest of the steam generated at the boiler is consumed in space heating, kitchens, the laundry, etc. Since CS and OR represent so small a "customer" for steam, it is not possible for the boilers to be managed for the sake of providing pure steam for sterilization. Those responsible for the boiler's operation and maintenance have little choice but to operate the boiler so that there is no chance of interrupting the other essential hospital services which require steam.

A standard specification for steam is that it be 97% free of condensate or liquid water. However, this specification is rarely attained in practice. "Wet" steam is more likely to deposit entrained solids or dissolved staining agents on instruments than dry steam. It is also, of course, a primary cause of wet packs.

Conditions vary hour by hour

Impurities in steam vary from season to season, from day to day, even from hour to hour. Large "slugs" of condensate can flow into the system when a boiler is being adjusted to a new operating condition. Another source of condensate in sterilizer lines results from the fact that the sterilizer is typically in operation for less than six hours of a 24-hour day, leaving static steam in the lines for at least 18 hours. Some of this steam will condense; the condensate will collect in a low spot in the line to the sterilizer. Thus, when the steam valve is opened, this collected condensate will be blown into the sterilizer. Because of the intermittent steam flow to the sterilizer, the quality of steam in the sterilizer is invariably and considerably wetter than steam in the main distribution system.

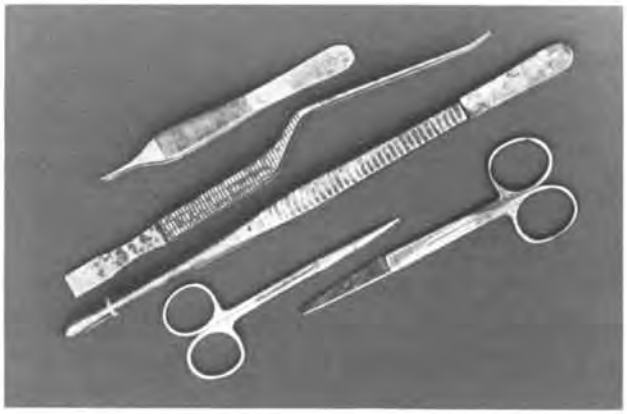
Still other factors affect steam quality. Some hospitals report they have more staining problems during the summer when boilers are operating at a low capacity, resulting in low flow and a relatively high condensation rate of steam in the main distribution lines. A New York hospital notes more impurities in the summer months because the city's reservoirs are then at their lowest point and silt enters the make-up water for the boiler. Changes in operations, repairs, even so inconsequential a thing as opening and closing a valve, can shake down pipe scale and rust. Older plants tend to have more scale in the pipes; newer ones may be troubled by construction debris.

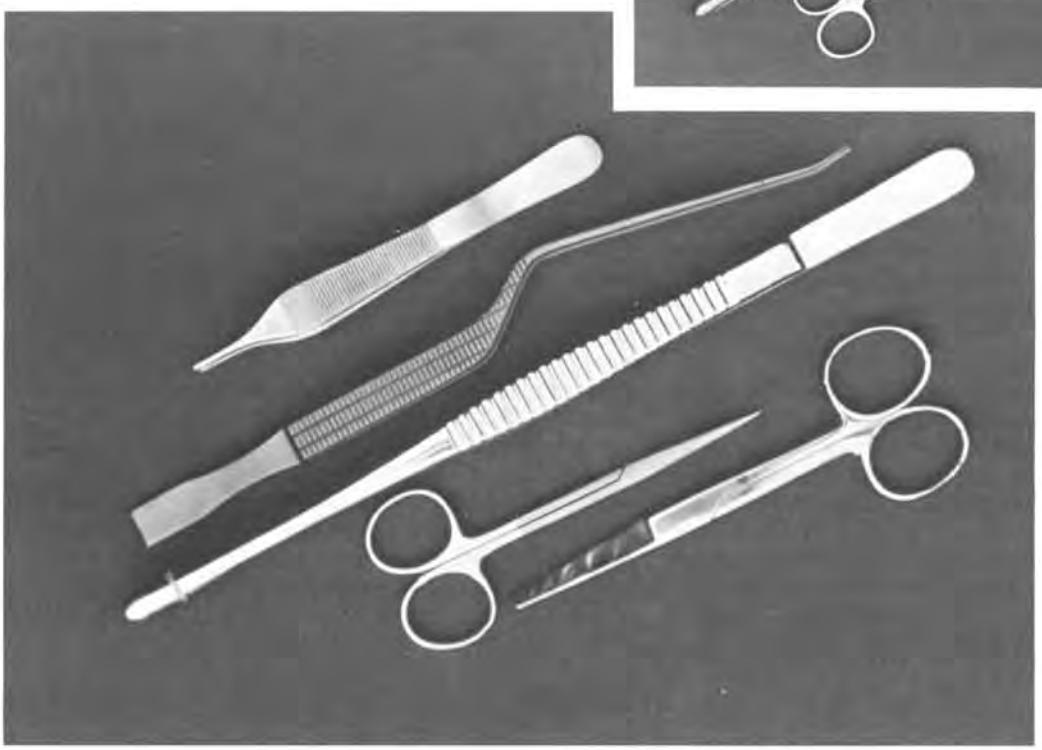
Types of impurities

Impurities in steam for sterilization can be categorized as follows:

- **Solid dirt**—rust pipe scale, particles of packing and gasketing materials, lubricants. These insoluble contaminants are carried primarily by the condensed water.
- **Soluble chemicals**—boiler feedwater additives and soluble salts and organic compounds present in the make-up water. Solubles will also be dissolved in condensate.
- **Vapor impurities**—usually from volatile boiler feedwater additives.

Stains are caused, not by imperfections of the instruments or malfunction of the sterilizer, but by the purity of the steam itself. You can eliminate this problem by controlling the quality of the steam.





So, it can be seen that except for fortuitous dirt, most of the contaminants in steam are deliberately introduced—and introduced for the purpose of maintaining a reliable boiler and steam distribution system.

It will be helpful in understanding why "contaminated" steam is more likely the norm than the exception when it is known why these chemicals are added to the boiler feedwater. Phosphate salts and soluble organic dispersants are used to retard the formation of scale—calcium, magnesium and silica salts—on hot boiler tubes. Such scaling reduces heat transfer efficiencies, thus increasing energy consumption. These additives may comprise 30-40 parts per million (ppm) in the feedwater.

A second type of additive is used to control corrosion. Corrosion is accelerated in the presence of free acid (pH below 6) and oxygen. Adding a caustic, usually sodium hydroxide, will raise the pH above 7 to control free acid. Oxygen scavengers, usually sodium sulfite or hydrazine, are used to control free oxygen. Caustics are usually the largest single element, by weight, as a feedwater additive.

The problem with pH is compounded because there is no widespread agreement on what pH is most desirable. Leading authorities recommend that the pH in boiler feedwater be anywhere from 7.2 to 11.5. Beyond that, it has been shown that conventional pH papers read approximately two units too low when testing boiler condensate. A reading of pH 7.5 on conventional pH paper, for example, could indicate an actual pH of 9.5.

This last problem has been solved by the introduction of a pH reading kit that is specifically calibrated for boiler condensate. Nevertheless, it is evident that no one knows precisely what the optimum pH should be, and many do not know accurately what the pH actually is in a given situation.

The volatile amines are the third type of additives used to prevent corrosion in steam lines and condensate return lines. These amines are present as vapors in quantities of about 15 ppm.

As to which of these additives may be "approved" for use in steam for sterilization, there is very little guidance available. In response to a query to the Food and Drug Administration (FDA) regarding amines in boiler feedwater providing steam to hospital sterilizers, FDA representative James Chantler responded in a letter (dated April 25, 1980); "It is our *opinion* that any amine allowed in steam concentrate systems for use with food products can at this time be safely used in the sterilization of medical devices." (Emphasis added.)

"Wet" steam is more likely to deposit entrained solids or dissolved staining agents on instruments than dry steam.

All of the foregoing serve to demonstrate that the causes of instrument staining are complex, but they are basically inherent in a system which must use certain soluble and volatile additives, in which accidental impurities are present, and where wet steam is a more-likely-than-not operating condition.

What to do?

One solution is to install dedicated steam generators. This can be an expensive alternative, however, and you could still run the risk of additive-causing staining. Another solution is to filter the steam with a filter of the "coalescing" type. This kind of filter permits the removal of liquids as well as solids. Collected liquids are drained automatically from the filter.

Although filtering is relatively inexpensive and simple to install, there are a number of imperatives that must be accepted if a filtration program is to achieve the desired result—an end to stained instruments and wet packs.

- First, a filter must be installed on *every* sterilizer as close to the steam inlet as possible. This is because a pipe run of only a few feet can still impart rust and pipe scale to the steam and it can still harbor condensate. Also, it should be obvious that if a filter is installed on only one or two of the total number of sterilizers in use, those sterilizers not equipped with filters may continue to cause staining and wet pack problems.
- Second, filter tubes must be changed on a regular basis. It is essential that the tubes be changed at the manufacturer's recommended interval or the filter will no longer be able to fulfill its function.
- Third, good boiler maintenance is required, filter or not. The pH should be kept within reasonable limits (7.2-11.5); boiler feedwater additives should be present in the correct amounts, and the steam should be kept as dry as possible.

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Steam Quality

PROBLEM: Using steam for sterilization that is generated by the hospital's boilers can sometimes cause sterilization problems due to additives, steam quality, demand, etc. Steam used for sterilization should be supplied from a dedicated steam generator system.

Should steam for sterilization be supplied by a dedicated steam generator system? That was the question we asked our readers last summer in our Premier issue. Judging from the number of responses we received (some 60 readers responded) we can only conclude that steam quality isn't a big problem for the majority of our readers.

Steam quality doesn't have to be a major concern if everyone from the administrator to the engineer understands the special nature of steam sterilization. Steps taken to avoid common problems, such as installing filters, eliminating excessive chemicals (detergents, bleaches, etc.) in linen wrappers, and coordinating the steam needs of CS with other hospital departments to assure adequate pressure when needed, will work if the right people are "tuned in."

On the other hand, some hospitals have found it better to install dedicated steam generators for their high pressure steam sterilization requirements. This eliminates these common steam problems and, at the same time, reduces energy costs and precipitation problems incurred by piping steam from the boiler room to the CS. Some believe a dedicated steam source designed for a sterilizer makes preventive maintenance easier since it can be regarded as a complete package. The result is certainly more consistent quality and better manufacturing control.

By a margin of four to one, those who responded to our FORUM questionnaire agreed with the statement *"Steam used for sterilization should be supplied from a dedicated steam generator system."* Of those who agreed, however, less than 16% currently have a dedicated steam system in their hospitals. Another 68% did not have such a system, nor were there any future plans for installing one. (And 16% didn't indicate what kind of steam generation system they used.)

Those who disagreed with the statement were unanimous in placing the blame for poor steam quality on lack of filters, chemical additives or poor communication with other hospital departments, especially steam engineers. To these individuals, the additional costs of installing and maintaining dedicated steam generation systems could not be justified.

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Steam used for sterilization should be supplied from a dedicated steam generator.		We have a dedicated steam source.				We have problems with our steam:			
		Yes	No	No, but planning to install	No response	Continuously	Occasionally	Never	No response
AGREE	75% (45)	15.5% (7)	68.8% (31)	0% (0)	15.5% (7)	17.7% (8)	64.4% (29)	4.4% (2)	13.3% (6)
DISAGREE	18% (11)	0% (0)	81.8% (9)	0% (0)	18.1% (2)	0% (0)	36.3% (4)	45.4% (5)	18.1% (2)
UNDECIDED	6%) (4)	25% (1)	0% (0)	0% (0)	75% (3)	0% (0)	100% (4)	0% (0)	0% (0)
TOTAL NUMBER OF RESPONSES	60	13% (8)	66% (40)	0% (0)	20% (12)	13% (8)	62% (37)	12% (7)	13% (8)

Here's what you had to say

"I believe there should be a more cost effective means of solving steam problems than having a dedicated steam generator. One should be able to communicate with other departments involved in order to correct steam problems." *Richard Smelter, SPD Supervisor, Community Memorial Hospital, Menomonee Falls, WI.*

"An additional boiler to accommodate sterilizers alone would not be cost effective; you would still have to add the additives to keep the boiler operating effecitvely if there was a dedicated boiler. Boiler upgrading would be the most cost effective method." *Scott Morrow, SPD Coordinator, Medical Center of Beaver County, Beaver, CO.*

"With proper steam filters, our systems work fine." *William Hoffman, SPD Director, Providence Hospital, Sandusky, OH.*

"This would be the ideal situation to have, but in existing hospitals, this is an unlikely situation. There are no dedicated steam sources that I know of in this area." *Robert Richardson, Assistant Director, Materials Management, St. Joseph Hospital, Towson, MD.*

"I think that dedicated systems are usually an added expense that many hospitals cannot afford. We have found that instrument staining, wet packs, and linen spotting were more the result of the chemical composition of cleaning additives and mechanical/technical errors than 'boiler' problems." *Jean Atkinson, RN, CS Manager, Community Hospital, Anderson, IN.*

"Yes, I agree that steam used for sterilization should be treated differently than steam used for other purposes. Also, we have experienced problems on numerous occasions with peaks and valleys in pressure." *John Rafferty, SPD Manager, Nasbett Hospital, Kingston, PA.*

"A dedicated supply fed by deionized or distilled water is my concept of the ideal. If the ideal is not feasible, a minimum of in-line filters, conditioning equipment, etc., comes close. In no case should plant generated steam be considered state of the art. I recently installed two filters on my 'vacs'. The results have been most gratifying." *Mike Mullen, CMS Manager, The Malden Hospital, Malden, MA.*

"Since we have gone to disposable wrappers, we have had problems with wet packs, which makes us wonder what problems we had and could not identify with linen wraps." *Carol M. Moesching, CS Manager, Community Hospital of San Gabriel, San Gabriel, CA.*

"This problem can probably be linked with waste disposal and energy conservation. Relatively new in the marketplace are incinerators which will generate steam for other uses. With the new EPA regulations and the problems you cite, this would handle both problems." *Ric Marden Jr., Assistant Manager, Central Processing, Beth Israel Hospital, Boston, MA.*

"It would seem to be more economical to use steam filters to eliminate impurities. It's also easier to convince the Engineering Department to use them." *R. Gehrman, SPD Manager, St. Mary's Hospital, Minneapolis, MN.*

"Our problem has shown up when sterilizing white towels—they show up spotty. Can't be too sure whether it's a laundry problem or a steam problem." *D.P. Marchiuhiewicz, Chief, SPD, Hines V.A. Hospital, Hines, IL.*

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American Society for Hospital Central Service Personnel

Excerpted from *Steam Purity: Resolving Observed Problems*, a technical document prepared by the Steam Purity Task Force, American Society for Hospital Central Service Personnel of the American Hospital Association.

Steam Filters

"As a last line of defense against boiler system upsets, a properly sized steam filter should be installed on the steam line ahead of the steam control valve, located just above the sterilizer. All sterilizer problems caused by dirty steam can be controlled or eliminated by filtering the solids and liquids out of the steam before the steam enters the sterilizer.

To alleviate the sterilizer problems, the steam filter must be an extremely efficient solids filter (less than 1 micron), must remove liquid water from the steam with equal efficiency, and must be rugged enough to provide a practical service life under varying conditions of steam flow rate, pressure, and quality.

It is strongly recommended that a filter system with a filtration efficiency of greater than 98 percent against 0.1 micron particles be installed. Even with a good preventive maintenance program for the boiler and distribution system, momentary system upsets will occur. The filter system guards against these upsets having a negative effect on the sterilizer. It can also reduce maintenance problems with the steam control valve and door seals. Routine chamber cleaning costs should significantly decrease."

Reference:
Steam Purity: Resolving Observed Problems
Prepared by: Steam Purity Task Force, American Society for Hospital Central Service Personnel of the American Hospital Association.
ASHCSP Technical Document 031801, page 37, March, 1985

To obtain a copy of ASHCSP Technical Document 031801, write to:
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SOUTHERN MAINE MEDICAL CENTER CENTRAL SERVICES ELIMINATES WET PACKS AND REDUCES STERILIZER MAINTENANCE COSTS BY 32%

This seven-year old institution started experiencing serious maintenance problems and reduced productivity after three and a half years of operation.

Although all new equipment had been installed originally, an unidentifiable foreign substance, pipe scale and boiler additives were raising havoc with their sterilizers.

The following details how Ray Averill, Central Services Supervisor for Southern Maine Medical Center solved his problems.

Southern Maine Medical Center Central Services Eliminates Wet Packs and Reduces Sterilizer Maintenance Costs by 32%

Ray Averill, Central Services Supervisor for Southern Maine Medical Center (S.M.M.C.), Biddeford, Maine, reports that he has eliminated a serious and costly wet pack problem, increased productivity by 25%, eliminated staining of sterilized instruments, and reduced maintenance costs by 32% with the installation of Parker/Balston® steam filters on his two sterilizers.

Central Services provides all instrumentation for the four operating rooms at S.M.M.C., a 150-bed, 7-year-old institution. This heavy demand requires both sterilizers to be in use 24 hours a day, seven days a week.

"After about three and a half years of operation, we started averaging as many as six wet loads a day, black particulate matter was being blown into the sterilizers, the sterilizer check valves were gumming up to a point we couldn't get through a two-month PMA (Preventative Maintenance Agreement). We were scrubbing the sterilizers every week trying to keep the junk out of them. It was a nightmare, a real nightmare."

"We're one of those hospitals that doesn't have the ideal steam generator. We have hard water, and they treat the water for hardness as well as adding amines to keep the pipe scale down. Things were gumming up to the point where I couldn't keep a (steam) trap element two months. They would gum, stick open, causing steam to pour out of the chamber even with the doors open. It was unbelievable!"

Mr. Averill's maintenance logs showed that every part of both sterilizers was being affected. Some of the problems listed were: sterilizer chamber not vacuuming; blowing off jacket pressure; jacket pressure assembly required repair; intermittent sticking in pre-vacuum; and sticking in cycle, all problems being attributed to the gunk in the lines.

"When you're averaging 24 leads a day and six of them are being rejected because of moisture problems you're losing 25% of your productivity. That's a lot of wasted dollars."

In addition to his moisture problem, Mr. Averill was also experiencing staining of instruments. "We were using muslin at the time. The muslin would come out of the sterilizer brown and stained. If you opened an instrument tray in the O.R. you could see where the stains had splattered onto the instruments. Because we do all the instruments for the operating rooms for the entire facility, our equipment is right there under the spotlight all the time. We were getting complaints about the appearance of our product."

To alleviate the problem, Parker/Balston steam filters were recommended and installed on both sterilizers by Parker Hannifin Corporation of Tewksbury, MA.

"When we put the Parker/Balston filters in, it immediately took care of the moisture and gum. It was like night and day."

Mr. Averill calculates "the two filters paid for themselves in the first two months they were in use." Prior to the Parker/Balston steam filter installation, preventative maintenance costs were averaging $5400 for contract maintenance per year plus an additional $5000 in replacement parts and emergency service calls. After the Parker/Balston steam filter installation, replacement parts were reduced to a nominal cost of $2500 and engineering service calls were eliminated altogether - an identifiable annual savings of $2500.

This savings does not reflect in-house labor costs for redoing rejected sterilizer leads, an average of six per day, at a cost ranging between $150 to $400 per load depending upon what the load consisted of.

"Our main concern is the quality of the product we deliver to the patient. We pride ourselves on producing a quality product because we do a lot more to our instumentation than most places do. For instance, we hand wash everything before we machine wash, which makes a big difference in their appearance. Now that we've installed the Parker/Balston steam filters, we're not getting the spotting, rusting, staining like we did before. Our dirty instrument ration now is like 1%. You might find one out of 114 instruments that's dirty, but that's because of human error, not because of something the sterilizer did to them."

Comments Mr. Averill, "As far as I'm concerned, Parker/Balston steam filters are the solution to my problem. We did have a serious moisture problem, we don't any more."

For complete information and prices on Parker/Balston steam filters call toll free **1-800-343-4048**.

Notes

Notes

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Reprinted August 2010

Bulletin PK5 Hospital-A

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