



CULINARY & PROCESS STEAM

Process Filtration

Similar to compressed air, steam is often thought of as a separate utility. Both are often used to transfer energy, and both are often generated at a central location and then distributed to various points-of-use throughout a facility. Depending on the intended application, and whether or not contact is made with the final product itself, both require filtration to prevent contamination of processes. The industry and application for use is what drives the choice between the two utilities.

Steam provides unique advantages in the transfer of energy. With the ability to hold a great deal of energy stored as heat in a given volume, steam gives up its heat energy at a constant temperature. This eliminates heat gradients associated with other forms of energy transfer. Steam also has a high rate of heat transfer, allowing for smaller heat transfer surface area.

TYPES OF STEAM

PROCESS

General term for steam used in process applications as a source of energy for process heating, pressure control and mechanical drives. Process steam may come into contact with the final product or process.

CULINARY

Steam used in food processing, required to meet 3A Sanitary Standards and 3A Accepted Practices for Dairy and Food Processing applications. Culinary steam can make direct contact with the final product.

DRY

Steam consisting of 100% water vapor in the gas phase.

DRY SATURATED

Achieving states of dry and saturated steam simultaneously is possible in theory, but nearly impossible in practice. When systems are optimized for generating saturated steam, the actual level achieved is measured as the “dryness fraction”.

SUPERHEATED

When more heat energy is added to steam that has reached saturation, and no liquid water is present to consume that energy through evaporation, the temperature of the steam will rise. In this condition, steam is said to be “superheated”.

CLEAN IN PLACE (CIP)

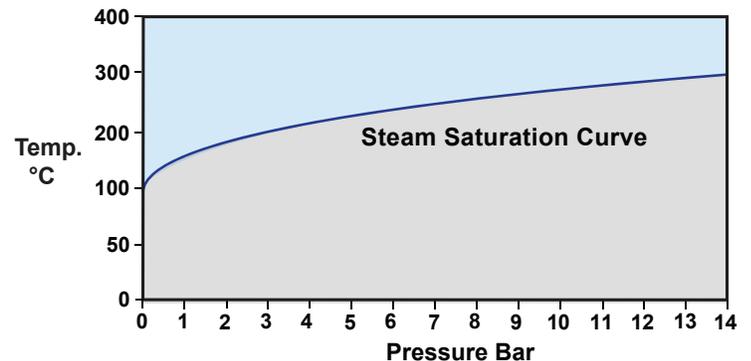
The process of cleaning equipment where it is installed; as opposed to taking out of service and to a remote location.

STERILIZE IN PLACE (SIP)

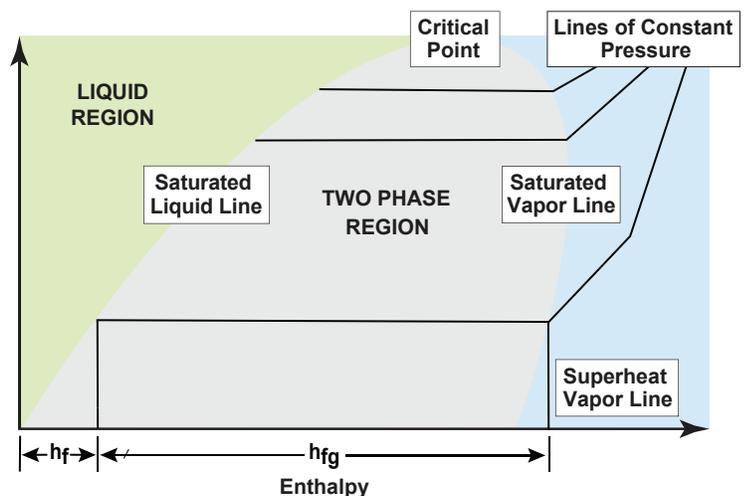
Similar to CIP, but with the goal of sterilizing the hardware where it is installed without disassembly.

SATURATED

Steam is said to be “saturated” with energy at a given and constant pressure when the addition of more heat to the generation system results in more steam, but no rise in steam temperature. In this state steam cannot hold more heat energy in a given volume unless pressure is allowed to rise.



TEMPERATURE ENTHALPY PHASE DIAGRAM



SIZING & SELECTION

Proper sizing and component selection of a steam filtration systems is essential to assuring that your application is operating as effectively and efficiently as possible. The following are some general guidelines, but additional sizing and selection tools are also available to better optimize product selection to your specific needs.

HOUSINGS

R.P. Adams GP-EG NPT housing in 304 SS is suitable for process steam filtration applications. In installations where chemical corrosion is a concern, 316L SS is the material of construction is advisable.

For culinary steam, food contact and other sanitary applications the GPG-EG Sanitary Grade, 3-A certified housing is used. 304 SS is also suitable for most applications, but 316L is often selected due to its higher resistance to corrosion.

SIZING

Properly sizing a steam filter system depends on a number of variables including:

- Flow Rate (Lbs./Hr.)
- Pressure and Temperature
- Element Micron Rating
- Acceptable Pressure Drop Across Filtration System

ELEMENTS

The R.P. Adams GP-GS steam filter element is available in a number of different rated micron sizes. For culinary steam applications, the 5 micron element exceeds the 3-A requirement of 2 micron at 95% efficiency. The micron rating selection for other applications will depend on the challenge rate, size of particles to be filtered, and the purity requirements of the downstream process using the filtered steam.

If the challenge is high in terms of particle count and/or size, use of a GP-GSL N prefilter is advised. Both the GP-GSL N and GP-GS elements can be regenerated, and a combination of both as prefilter and after-filter will assure the most reliable and economic installation.

INDUSTRIES SERVED

- Pulp & Paper
- Power Generation
- Chemicals
- Automotive
- Rubber & Plastics
- Food & Beverage
- Pharmaceutical
- Metal Processing

APPLICATIONS

- Cooking
- Drying
- Cleaning
- Curing
- Sterilizing
- Temperature Control



FILTER ELEMENTS

GP-GS

SINTERED STAINLESS STEEL

Purified steam used in culinary and food applications like cooking, sterilization and packaging, is essential to maintaining product integrity. The improved quality of steam used for filter sterilization ensures a longer service life of filter and equipment.



- Absolute particulate retention rates of 1µm, 5µm and 25µm
- Filter media made of sintered 316 L stainless steel
- > 50% porosity ensures a high dirt holding capacity & low pressure drop
- Withstands differential pressure of 75psi
- Regenerable in an ultrasonic bath
- Meets U.S. FDA, CFR Title 21 and 1935 / 2004 / EC requirements for food and beverage
- Recommended with GP-EG and GPG-EG housings

GP-GSL N

STAINLESS STEEL

Offers high dirt holding capacity combined with low differential pressure, for a wide variety of applications in a highly durable, all stainless steel filter element.

GP-GSL N is an ideal solution for low pressure steam.



- Absolute retention rates at 1-250µm in steam
- 100% stainless steel construction
- Approved for food contact according to U.S. FDA, CFR Title 21 and 1935 / 2004 / EC
- Contains no binders, adhesives, additives or surfactants
- Regenerable by back-flushing or ultrasonication
- Withstands differential pressure up to 75 psid
- Recommended with GP-EG and GPG-EG housing

FILTER HOUSINGS

GP-EG

GAS & STEAM FILTER HOUSING

Economical solution when filtering air, gases or steam.



- Available in 304 or 316L stainless steel
- 18 sizes in flow capacities from 35-13,000 scfm
- Low differential pressure at high flow rates
- Inner Surface:
 - MODEL: 0006-0288
Pickled and Passivated to Ra 63
 - MODEL: 0432-1920
Bead Blast
- Outer Surface Finish:
 - MODEL: 0006-0288
Pickled, Passivated, Polished to Ra 63
 - MODEL: 0432-1920
Bead Blast
- NPT & ANSI Connections
Alternate connections available upon request

GPG-EG

SANITARY GAS & STEAM FILTER HOUSING

Designed for the purification of compressed air or technical gases in sanitary and hygienic applications.



- 3-A certification for Models 0006-0192
- Available in 304 or 316L stainless steel
- 12 Sizes in flow capacities from 35-13,000 scfm
- Low differential pressure at high flow rates
- Inner & Outer Surface:
 - MODEL: 0006-0192
Electropolished to Ra 32
 - MODEL: 0432-1920
Nitric Passivated to Ra 32
- Connections:
 - MODEL: 0006-0192, Tri-Clamp
Alternate connections available upon request
 - MODEL: 0432-1920
ANSI Flange Connection

CAPACITIES & GUIDELINES

REGENERATION GUIDELINES

Both R.P. Adams GP-GS and GP-GSL N filter elements can be regenerated using a number of different techniques. In general, the more frequently an element is cleaned, the better the regeneration.

METHODS OF FILTER REGENERATION

COUNTER-FLOW

The filter media can be washed with either clean liquid or clean gas in a reverse, or counter-flow, cycle. Pulsing the flow to loosen attached particles can enhance cleaning. This method is excellent when retained particles are on the surface of the media rather than penetrated deeper into the media pores. Use of a wire or nylon brush can also enhance this method of cleaning.

SOLVENT CLEANING

In some cases, oil and other contaminants in the steam cause particles to be retained on or within the filter media. Detergents and/or solvent cleaning might be required in these instances, not only to remove the oil or oil-like contaminants, but to release particles as well.

ULTRASONIC CLEANING

The most thorough regeneration can be achieved using ultrasonic cleaning. In this method, filter elements are immersed in a solvent or water bath in which ultrasonic vibrations loosen and remove particles embedded in the media. Regeneration leaves elements close to their original state.

HOUSING CAPACITIES*

Model Number	Steam Capacity (Lbs./Hr)	Model Number	Steam Capacity (Lbs./Hr)
GP-EG 0006	100	GPG-EG 0006	100
GP-EG 0009	150	GPG-EG 0018	160
GP-EG 0012	175	GPG-EG 0032	400
GP-EG 0018	225	GPG-EG 0072	800
GP-EG 0027	300	GPG-EG 0144	1,800
GP-EG 0036	430	GPG-EG 0192	2,500
GP-EG 0048	610	GPG-EG 0432	4,500
GP-EG 0072	800	GPG-EG 0576	5,850
GP-EG 0108	1,075	GPG-EG 0768	9,200
GP-EG 0144	1,650	GPG-EG 1152	12,000
GP-EG 0192	2,050	GPG-EG 1536	14,900
GP-EG 0288	2,530	GPG-EG 1920	17,100
GP-EG 0432	4,500		
GP-EG 0576	5,850		
GP-EG 0768	9,200		
GP-EG 1152	12,000		
GP-EG 1536	14,900		
GP-EG 1920	17,100		

* Assumptions -
Pressure 50 psig



R.P. ADAMS

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Notice: This document is not intended as a replacement for careful review of all applicable laws, regulations, and standards. It is the user's responsibility to design, use, and maintain a steam system in accordance with all applicable laws, regulations and standards. Many factors beyond the control of R.P. ADAMS can affect the use and performance of R.P. ADAMS products in a particular application, including the conditions under which the product is used. Since these factors are uniquely within the user's knowledge and control, it is essential the user evaluate the products to determine whether the product is fit for the particular purpose and suitable for the user's application. All products, specifications, availability and data are subject to change without notice, and may vary by region or country.

