

R.P. Adams Company Inc.
Reliability by Design

Application News

Steam condensate filtration

Protecting boilers and preventing product contamination

Steam is an essential ingredient in hundreds of manufacturing processes, an old and trusted energy source. But all steam is not created equal. Some steam contains iron. While iron is an element with many good qualities, it and traces of other substances are unseen and unwelcome guests in steam because they can contaminate the product during the process and also cause serious problems in the boiler.

The boiler itself is fundamental. It generates the energy that yields the steam. Whether that steam is being used to produce paper, tires, food, chemicals, or any of scores of other products, the boiler is vital. Most boiler operators are very protective of their boilers and they assume that with regular maintenance it will always operate at peak efficiency.

It won't.

Unless steps are taken to eliminate the traces of iron and other substances that are present in the steam, eventually they will cause scale buildup in the boiler, reducing boiler efficiency, resulting in the need for frequent cleanings, and causing tube

failure from overheating. One reality is absolute: when there is boiler trouble, production is slowed or stopped, costly events that could have been avoided if the boiler condensate had been properly conditioned.

Adams has considerable experience and success

R. P. Adams Co. has notable successes in the specialized area of condensate filtration. Adams Poro-Carbon filters are efficient and durable, capturing traces of iron and copper as small as 2 micron. Company records are filled with reports of uninterrupted and successful operation for many years.

In Green Bay, Wisconsin, for example, Green Bay Packaging, Inc., manufacturers of liner board for the box industry, has been using an Adams system to filter condensate since 1988. The system has been trouble-free since it went into operation.

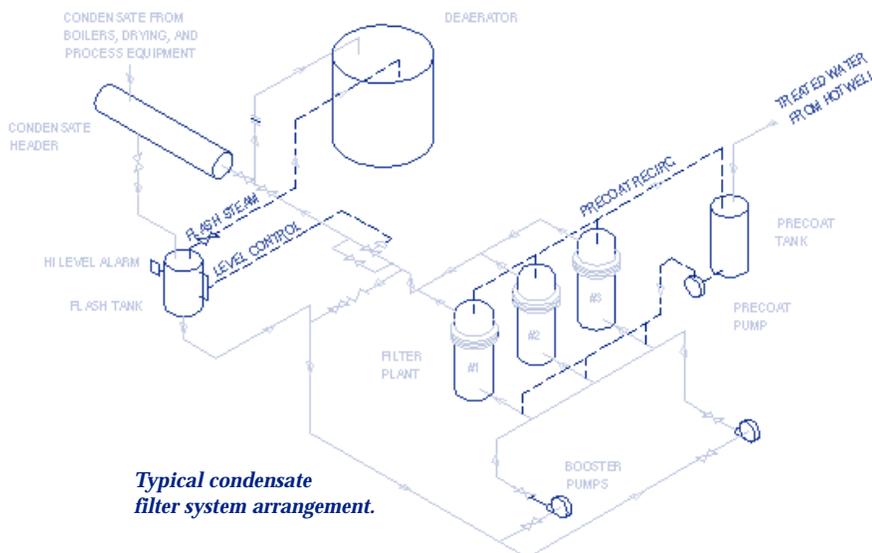
"We have never had to perform any maintenance on the filter system and the cost of operation is negligible," said Gary Massey, of Green Bay Packaging.

"It is very cost effective."

With a greater open area than competitive equipment, Adams filters using the Poro-Carbon media with precoat filter aid, can operate at a high flow density. The porosity of the Poro-Carbon media make it ideal for a uniform precoat distribution. The relatively small pore diameter and depth, enables the media to handle greater differential pressures or fluctuations in flow.

The filtration process

Adams systems use a wood pulp derivative, alpha cellulose, as the filter aid. It is practically free of silica gel and forms a mat or precoat over



Typical condensate filter system arrangement.

Steam condensate filtration

► the filter media. The filter aid is mixed with water and recirculated through the filter, forming a precoat layer. The precoat then does the actual filtration. Many applications also have trace amounts of oil present that the Adams system successfully removes from the condensate. At the conclusion of the filtering cycle, it is backwashed and disposed of, along with collected contaminants. A fresh batch of filter aid can then be added to begin a new cycle. The Poro-Carbon elements are permanent filter media, and can be used for many years.

Maintaining boiler efficiency

Scale buildup in a boiler results in loss of efficiency and must be remedied with periodic acid cleaning. A boiler with tubes narrowed by iron scale operates far below the design efficiency, so the tubes must be kept clean. Yet most authorities recommend as few acid cleanings as possible for a boiler because the acid, while removing the scale, actually causes corrosion damage and shortens the life of the unit.

The prudent answer seems clear: eliminate the problem of scale buildup before it begins by filtering the condensate.

Filtration also guards against the fouling of downstream demineralizers. Suspended iron can quickly

lead to resin-bead fouling and reduced ion exchange capability. The more frequent the regeneration of the resin bed, the more rapid the breakdown of the resins, causing earlier replacement. By increasing the time span between regeneration, thus restricting the use of regenerative chemicals, the investment in chemicals will be reduced.

There are other methods of filtering condensate, but the Adams system has benefits that can't be matched. Some industries use sand filters, but there are two serious problems related to such units. The silica can contaminate the manufacturing process, and the sand filters require frequent (usually weekly) backwashing, consuming large amounts of water, depending on the size of the filter. A typical sand filter might require 10,000-20,000 gallons of water for backwashing while a comparable Adams filter can be automatically backwashed with about 500 gallons of water. Generally speaking, for backwashing the Adams units require just 5 percent or less of the water volume needed by a sand filter.

In addition to Poro-Carbon, Adams can supply a wedge wire (Poro-Edge™) media. Poro-Edge can be precoated and used in applications where greases and oils are present in the condensate. However, for most situations, the Poro-Carbon is preferred because of the greater open area and more stable precoat.

Improving boiler performance, cutting operating costs

Adams filters can improve the performance and extend the life span of your boilers.

How? By filtering suspended iron from the steam condensate used.

That simple but strategic action yields these benefits:

- Reduces scaling, thus maintaining efficiency and extending boiler life.
- Minimizes maintenance costs and reduces the need for frequent acid cleanings that can weaken boiler tubes.
- Assures less down time.
- Protects fouling of downstream demineralizers.

Adams IWF filters have compiled a remarkable record for performance and durability over the years.

- They are compact and have no internal moving parts.
- The backwash uses a fraction of the water required by other systems and completes the backwash cycle in much less time than media filters.
- The Poro Carbon filter media provides uniform porosity and will remove particulate as fine or finer than 2 micron with a flow in excess of 2 GPM per sq. ft. of filter area.
- Economical to operate and maintain.
- Manufactured of durable materials that resist corrosion and wear and assure years of service. The life of the filter media generally exceeds 25 years.



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