

Pre-filter Allows for the use of “More Energy Efficient Regenerative Thermal Oxidizer (RTO)”

Over the years environmental regulations have reached every segment of the manufacturing industry, whether the process is related to chemical production, pharmaceuticals, or food production meeting EPA compliance is a part of every company’s business model.

However, compliance with air emission regulations is more difficult on some industries than on others. Industries whose process generates significant particulate mixed with the VOC’s discover they are restricted on the type of air pollution control (APC) device they use to control their emissions. The reason is the more energy efficient oxidizers (RTO’S) have heat recovery components which can be susceptible to plugging, which in turn leads to the expensive replacement of the recovery beds. To avoid the bed replacement costs it is common to use less energy efficient equipment such as “afterburners”



A Three chamber RTO is protected by a pulse jet dust collect is shown in the background.

which recover no or very little of the heat used to oxidize the VOC’s.

To address this issue, Air Clear, LLC has incorporated a variety of “Pre-Filtering” Technologies to remove contaminants up steam of the RTO Units. The plugging problem is exasperated due to the numerous types of contaminants plugging the APC units which can be classified into the following categories:

Solid inorganic particulate includes contaminants such as stone, dust, or silicon dioxide, common to the asphalt roofing shingle, found in remediation of hazardous landfills and in processes where silicone based lubricants is used, such as the manufacturing of high temperature silicone fabrics. Even if small quantities of the mineral fillers used in numerous products including pharmaceutical intermediate make their way into the exhaust, plugging of the RTO bed will occur in time.

Solid or semi-solid organic particulate such as food/flour dust, tars, biomass are found in the condensable particulate is most commonly “smoke” found in part quench operations, asphalt production/storage, textile manufacturing and food processing.

Condensable particulate such as oils, petroleum derivatives and various types of mists’

Variation in the types of particulates from one process exhaust to another has dictated that Air Clear apply several different types of its filtration equipment to best match the particular problem.

Equipment types:

Coalescing Fiber-beds: These “Candle Filters” have been and are still used in numerous applications to remove condensable hydrocarbons from exhaust streams. When applied as a pre-filter in the asphalt industry exhaust they remove a large portion of condensable hydrocarbons, which can be recycled, prior to entering the RTO greatly reducing the frequency of bake outs and media replacement.

A Stationary "Permanente" prefilter protects a two chamber RTO, keeping the fan and the energy recovery beds free from Acrylic monomers which is a very sticky glue like material. The System is eight years old and the prefilter and recovery beds have never been replaced. (Below)



If significant quantities of dry particulate are present in the exhaust, a conventional dust collector can be used to prevent bed buildup in the RTO recovery beds. When condensable are present in the exhaust a permanent pre-filter can be used to coalesce and drain the "Thick, Sticky" material. Because this material is self draining it has very low maintenance and filters last for many years.

When particulate loading is very high there are two (2) effective options:

- **Stationary unit with replaceable filters**
 - The filter type and efficiency can be varied to meet the specific requirements. This system is a cost effective solution when the process is not 24/7/365 operation. Two (2) hours of downtime on a monthly basis should be anticipated. These filters can remove solids in the HEPA range.
- **Indexing Filter**
 - Removes dirty media off the filter face and onto a "dirty" roll while bringing clean media off the "clean" roll. The media can run for several months without change out. In most cases the media can be changed without projection shutdown.
- **Coalescing Fiber-beds:**
 - These filters are best suited for condensable. They are effective at removing 99% of particulate 0.01microns and larger.

Pre-filtration of a contaminated air stream with a well thought-out and properly designed pre-filter has been proven to allow for the use of more energy efficient air emission equipment. These same pre-filters have been applied to existing APC equipment to greatly reduce and in some cases eliminate the need for expensive heat recovery media replacement. With numerous time tested pre-filter options installed in various industries Air Clear, LLC can help improve your bottom line by reducing energy consumption and system maintenance.



*For many years,
Fiber bed coalescing
filters (Right) have
been used
successfully protect
RTO's(Left) from
condensable oils and
tars from the
exhaust of Asphalt
roofing plants as well
as other asphalt
processes.*



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