What is Contaminating Your Compressed Air?

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Clean, dry, oil free compressed air and gas is a basic need for many industries.

One drop of unwanted oil can cause an entire automated process to malfunction. It can cause seals in pneumatic valves and cylinders to swell, resulting in sluggish operation – or in worst cases, complete seizure of moving parts.

3 things that can contaminate your compressed air system and ruin your product or processes.

1) Solid particles come from ambient air contaminants like dust and from rusted, oxidized pipe work. They will cause pneumatic equipment to malfunction, cause instrument and control failures, and contaminate end products.

2) Condensed water droplets come from the humidity in ambient air. Water will oxidize pipe work and pneumatic equipment, ruin paint finishes and end products.

3) Liquid oil and oil vapors are introduced by compressor lubricants and by hydrocarbon vapors present in ambient air. Oil-free compressed air is particularly important in food and pharmaceutical processes.

Compressed Air Filters effectively and efficiently remove solid particles, remnants of oil, water mist and other liquid from compressed air and gas which can…

- wear out pneumatic machinery
- block valves and orifices, causing high maintenance
- corrode piping systems which cause costly air leaks
- result in abrupt equipment stoppages, lost product, time and money

How to clean your Compressed Air…

Depending on the level of air purity required, different levels of filtration and types of filters are used. Filters are used in conjunction with other “filtering equipment” – such as a Water Separator or Compressed Air Dryer- to help remove harmful contaminates from your system.

General Purpose Filters – also called “particulate filters” are used to remove solid particles. Oil and Oil Vapor Removal

Filters – also called “coalescing-type filters” are used to remove oil and vapors.

A particulate filter is recommended after a desiccant-type dryer to remove desiccant fines.

A coalescing-type filter is recommended before a desiccant type dryer to prevent fouling of the desiccant bed.

Additional filtration may also be needed to meet requirements for specific end uses.

Compressed air filters downstream of the air compressor are generally required for the removal of contaminants, such as particulates, condensate, and lubricant.

Listed below are types of filtration equipment available in today's market.

Water Separator

Installation: after an air compressors' (or a stand-alone) aftercooler

Design: Labyrinth style air flow path removes liquid water by forcing abrupt directional changes.

Performance*: Handles bulk liquid inlet loads to 30,000 ppm w/w and provides 10 micron solid particulate separation. Efficient to flows as low as 5% of rated flow.

Separator/Filter

Installation: after an air compressors' (or a stand-alone) aftercooler or as a prefilter to a refrigerated dryer

Design: Two-stage filtration with first stage of two stainless steel orifice tubes which remove bulk liquids and solid particulates to 10 micron. Second stage has in-depth coalescing fiber media which captures solid particulates to 3 micron.

Performance*: Handles bulk liquid inlet loads to 25,000 ppm w/w and provides 3 micron solid particulate filtration.

General Purpose Filter

Installation: 1 micron particulate pre-filter for refrigerated dryers and high efficiency oil removal filters.

Design: Two-stage filtration with a first stage of multiple layers of fiber media which pre-filter the air. Second stage has in depth coalescing fiber media which coalesces oil aerosols and removes finer particulates to 1 micron.

Performance*: Handles bulk liquid inlet loads to 2,000 ppm w/w, provides 1 micron solid particulate filtration and oil removal to 1 ppm.

Dry Particulate Filter

Installation: Dry, solid particulate after filter for heatless desiccant dryers

Design: Two-stage filtration with life-prolonging outside/in air flow with first stage of alternate layers of fiber media and a media screen capturing large particulates. Second stage captures finer particulates. Not designed for any liquid loading.

Performance*: Provides 1 micron solid particulate filtration of desiccant dust.

High Efficiency Oil Removal Filter

Installation: Pre-filter to desiccant and membrane dryers, after filter to refrigerated dryers and stand-alone oil removal at the point-of-use of compressed air.

Design: Two-stage filtration with a first stage of multiple layers of fiber media which prefilter the air. Second stage has in-depth coalescing fiber media which coalesces oil aerosols. Includes an outer-coated, closed cell foam sleeve.

Performance*: Handles bulk liquid water inlet loads to 1,000 ppm w/w and provides 0.008 ppm oil aerosol removal and 0.01 micron solid particulate separation.

Maximum Efficiency Oil Removal Filter

Installation: Pre-filter to desiccant and membrane dryers with a Grade C pre-filter, oil-free air applications.

Design: Two-stage filtration with a first stage of a coated, closed-cell foam sleeve which acts as a pre-filter and flow disperser. Second stage has in-depth coalescing fiber media which coalesces fine oil aerosols. Includes an outer coated, closed cell foam sleeve.

Performance*: Handles bulk liquid water inlet loads to 100 ppm w/w and provides 0.0008 ppm oil aerosol removal and 0.01 micron solid particulate separation.

Oil Vapor Removal Filter

Installation: After filter to high efficiency liquid oil removal filters for true oil-free applications.

Design: Two-stage filtration with a generously-sized first stage of a stabilized bed of carbon particles which remove the majority of the oil vapor. Second stage has multiple layers of fiber media with bonded microfine carbon particles which remove the remaining oil vapors. Includes an outer-coated, closed cell foam sleeve which prevents fiber migration.

Performance**: No liquid should be present at filter inlet. Provides 0.003 ppm w/w oil (as a vapor) removal and 0.01 micron solid particulate separation.

* Filter efficiencies have been established in accordance with CAGI standard ADF400 and are based on 100°F (38°C) inlet temperature

** Filter efficiency has been established in accordance with CAGI standard ADF500 and is based on 100°F (38°C) inlet temperature

Filtration only to the level required by each compressed air application will minimize pressure drop and resultant energy consumption.

Elements should also be replaced as indicated by pressure differential to minimize pressure drop and energy consumption, and should be checked at least annually.

You can customize your air treatment applications by choosing the combination of dryers, filters, and separators that give you the level of clean air or gas that you need.

Who establishes quality industry standards for filters?

ISO 8573.1 was developed in 1992 by ISO (International Organization for Standardization) to help plant engineers specify desired compressed air quality globally by providing "Quality Classes" for solid particulates, humidity and oil. Quality classes provide engineers with an internationally accepted unit of measure.

A typical pharmaceutical plant, for example, would have a compressed air specification of ISO Quality Classes 1.2.1. This is equivalent to 0.1 micron particulate filtration, -40°F (-40°C) dew point, and 0.008 ppm (0.01 mg/m3) oil filtration. No matter what language is spoken and what unit of measure is used, using ISO 8573.1 Air Quality Classes ensures that your factory will get the compressed air quality you specified.