METAL FIBER (FMF) AND POROUS SINTERED (PM) ELEMENTS CLEANING INSTRUTIONS

The cleaning techniques for elements with Metal Fiber (FMF) and Porous Sintered Metal (PM) media are the same because both media types are for depth filtration.

Contaminants can be removed chemically by means of solvents, caustic wash, acid wash, as well as water, steam and air flush. Ultrasonic cleaning is used to remove chemically inert materials.

Cleaning of the filter elements can be accomplished in two ways: in situ (in place) cleaning or removal of elements from their housings for cleaning. In situ cleaning in liquid/solids systems can be accomplished by backwashing and, in gas/solids systems, by blowing back. The backwash or blowback methods are specific to each application, and can offer many process options. In addition, in situ chemical cleaning can be done using solvents or detergents, followed by rinses with a fluid compatible with the process. Cleaning filter elements by removing them from the system can be done by several methods: Chemical cleaning with compatible solvents, ultrasonic cleaning of insoluble solvents and controlled temperature/atmosphere fluid bed cleaning. Multiple cleanings of these elements is common. Do not mechanically clean FMF or porous metal elements. Wire brushing, scraping, sand or glass bead blasting can smear the pores and close off parts of the media.

Chemical cleaning of filter elements: Chemical cleaning follows a logical sequence. First, determine what contaminants are present in the filter. Next, determine the chemical agents that will dissolve these contaminants (without dissolving or attacking the porous metal).

The chemical agents compatible with 316L stainless steel porous & FMF media include, but are not limited to: • Water at any temperature, • 15% nitric acid at up to 150°F, • 20% caustic up to 212°F, • Alcohols • Acetic acid, • Acetone • Ammonia • Organic solvents • Methylene chloride • Industrial cleaners such as Oakite 31or Sonicor #103 (to remove grease), • Solvents and detergents

Soak the elements in the chemical agent as required, flush with clean, filtered water or other compatible fluid, blow out with clean air or steam. In some cases, two chemical agents may be required, for example, such as 15% nitric acid to remove iron oxide and 20% caustic to remove aluminum particulate, with a water flush between soaks.

Other methods of cleaning porous metal media: To remove inert or insoluble solids from porous metal & FMF elements, ultrasonic cleaning is an effective process. The fluid medium usually contains a detergent for maximum removal efficiency. It is recommended that ultrasonic transducers provide at least 60 watts per gallon of fluid in the ultrasonic bath. Cleaning may require from 10 to 60 minutes. Optimal results are obtained when the cleaning solution is flowed through the element in the reverse direction during ultrasonic cleaning. For elements used for gas/solids service, it is necessary to bake the elements in an oven at 300°F to 400°F after cleaning to ensure that all moisture is removed from the elements. Controlled atmosphere fluid bed cleaning is a very specialized process. Manufacturers of fluid bed cleaning equipment should be contacted to discuss the specific cleaning requirements.

Evaluation of cleaning effectiveness: To evaluate the effectiveness of cleaning and the integrity of the filter elements, it is necessary to air flow test, and leak and/or bubble point test the elements after cleaning. For post-cleaning evaluation to be meaningful, new elements should be serialized and "base lined", with air flow and bubble point data recorded before they are put into service. This provides a basis for comparison and evaluation. Air flow testing determines the differential pressure through the media at a given air flow, usually set at 2 scfm/sq. ft. After cleaning, the differential pressure at the same air flow may be only slightly higher than the "base line" value; a 10-15% increase is generally accepted as clean. A significantly higher differential pressure indicates ineffective cleaning. A second cleaning may be required. Bubble point testing, or leak testing, is a measure of integrity of a filter element or cartridge. Bubble point testing is the determination of the actual bubble point or "first bubble" of an element. Leak testing determines whether there are any "leaks" in an element at a pressure below the minimum bubble point for the particular media being tested. Another factor for evaluating filter cleaning is weight, "before and after". Record the weight of the new element on a precision scale and the weight of the element after cleaning and drying to determine the effectiveness of the cleaning. A higher weight indicates contaminants have remained in the filter media. Lower weight could indicate weight loss due to corrosion. The same weight indicates that the filter is free of contaminants.

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