

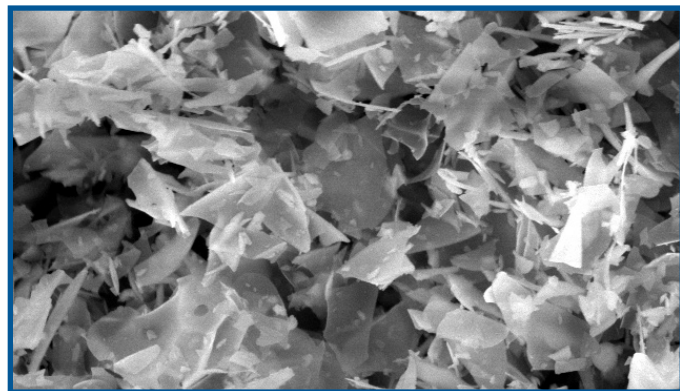
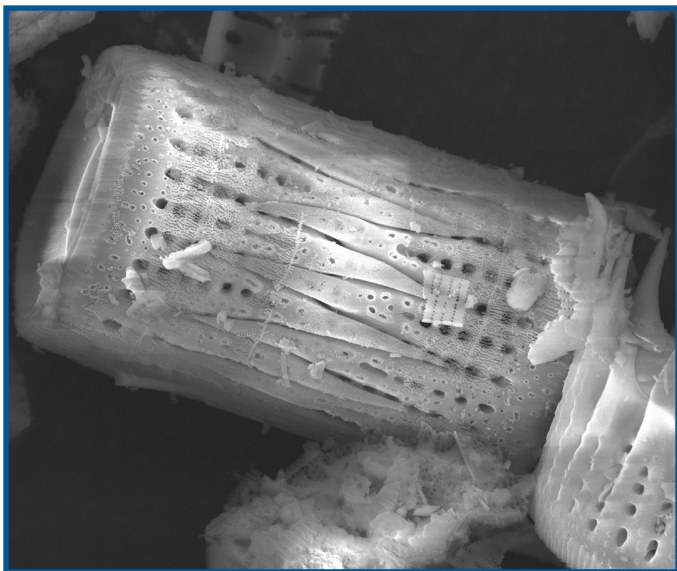
# A World of Filtration Experience



## A World of Filtration Experience

### Filtration Overview: The Removal of Unwanted Solids

Filtration is the separation of solids from a liquid by means of a porous medium that retains the solids but allows the liquid to pass. Utilizing filter aids like Diatomaceous Earth, perlite, and cellulose (known as depth filtration) will result in optimum throughput and help achieve maximum clarity of the liquid. This paper outlines the properties, features, and benefits of these engineered materials and their impact on your filtration needs.



### Filter Aid Requirements

Filter aids should be chemically inert and form high porosity filter cakes to maintain the free flow of the fluid. Efficient filter aids have irregularly shaped particles that interlace and overlay in a fashion that leaves 85% to 95% open spaces in the filter cake. These voids form billions of microscopically fine interstices between the filter aid and particles, trapping solids while permitting high fluid flow. The filter aid forms a porous cake on a septum, stopping solids while preventing them from blinding the septum. This mechanical process provides brilliant clarity and eliminates potentially dangerous contaminants. The use of filter aids also helps to maintain low pressures, which allow longer filtration cycles thus improving throughput.

*Diatomaceous Earth, perlite, and cellulose filter aids are benchmark materials that meet these criteria. They are available in a variety of grades to meet the solids removal requirement of any application.*

## A World of Filtration Experience

### Filtration Overview

#### Mineral Filter Aids for All Industries

To recommend a filter aid type and grade is nearly impossible without knowing your unique specifications, as there is no one filter aid that is suitable for all applications. The table below summarizes some of the major industries and applications requiring filtration but does not include everything. Details can be discussed for specific filtration needs through technical resources provided at the end of the guide. This guide provides a comprehensive overview of the various filter aids available to help your organization measure success. As you page through this guide, we encourage you to consider your specific application and requirements.



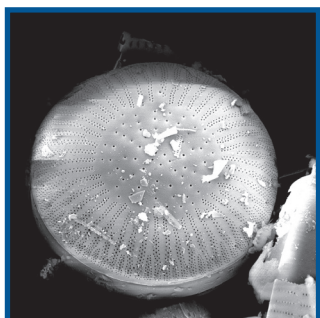
| Industry          | Application  |
|-------------------|--|
| Food and Beverage | Juices, beers, wines, sweeteners, oils, syrups, honey  |
| Pharmaceuticals   | Enzymes, antibiotics, epsom salt   |
| Industrial        | Biodiesel, sizings, oil and solvent recovery, greases, waste oils                                |
| Chemicals         | Inorganic and organic chemicals, resins, polymers, brine, adhesives, fertilizers, waste disposal |
| Paints & Coatings | Waxes, oils, varnish, gums, shellac  |
| Environmental     | Stormwater and wastewater filtration, ecology embankments, media filter drains                   |



## A World of Filtration Experience

### Diatomaceous Earth

Diatomaceous Earth is a form of silica that has been used as a filter aid for nearly a century. It is composed of the skeletons of microscopic plants deposited on the bottom of oceans and lakes after and during the Miocene Age from 100,000 to 15,000,000 years ago. The ore is a soft, friable, amorphous, siliceous mineral.

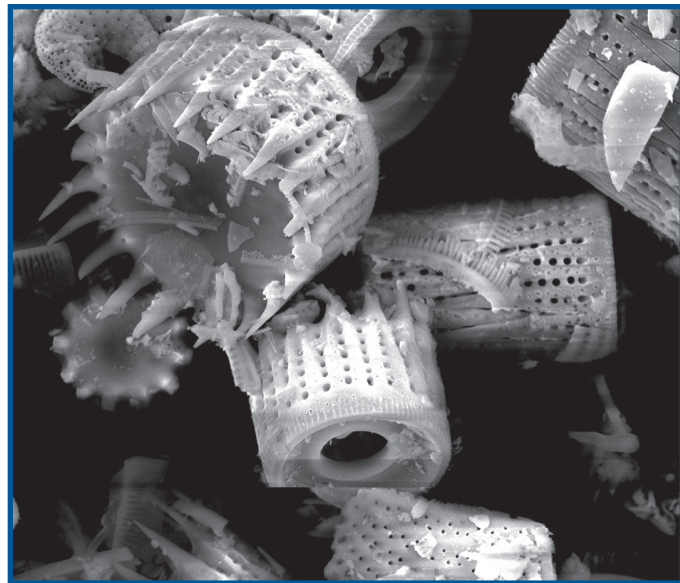


#### Why Diatomaceous Earth is an Ideal Filter Aid

To understand why Diatomaceous Earth makes a perfect filter

aid, you'd have to look through a microscope. Diatoms show up in a variety of forms. The symmetrical forms resemble honeycombs, disks, rods, cylinders, and snowflakes. This porous structure is what helps to trap solids and allow liquid to readily flow through the filter cake. This means it is a mechanical sieving, not a chemical treatment.

Diatomaceous Earth products are calcined and flux-calcined in order to improve their properties as a filter aid. The calcination process is performed at temperatures above 1500 degrees Fahrenheit, ensuring all products are free of organic matter.



### Diatomaceous Earth Filtration Applications

Diatomaceous Earth filtration use crosses many industries, from recreation to food and beverage, and pharmaceutical to automotive.

Some applications include:

- Swimming pools
- Food Production (sugar, sweeteners, and gelatin)
- Beverage Filtration (beer, wine, and juices)
- Biodiesel/Motor Oil Processing (soy, corn, palm oils, and animal fats)
- Pharmaceutical manufacturing
- Enzymes

## A World of Filtration Experience

### Diatomaceous Earth

#### Diatomaceous Earth for Food and Beverage Filtration

Diatomaceous Earth has been used for many decades as a filter aid and has been proven to be a safe way to remove contaminants from food and beverages. It is used to filter many consumable items you may use on a daily basis, like oils, fruit juices, syrup, sugar, honey, wine, beer, and more. Most bottled beer and wine have been filtered at some stage with diatomaceous earth to remove solids and other contaminants. Diatomaceous Earth is approved by several government agencies as a food and beverage processing aid.

*Dicalite Management Group's Diatomaceous Earth filter aids meet or exceed the specifications outlined in the U.S. Food Chemicals Codex.*



#### Beer Filtration

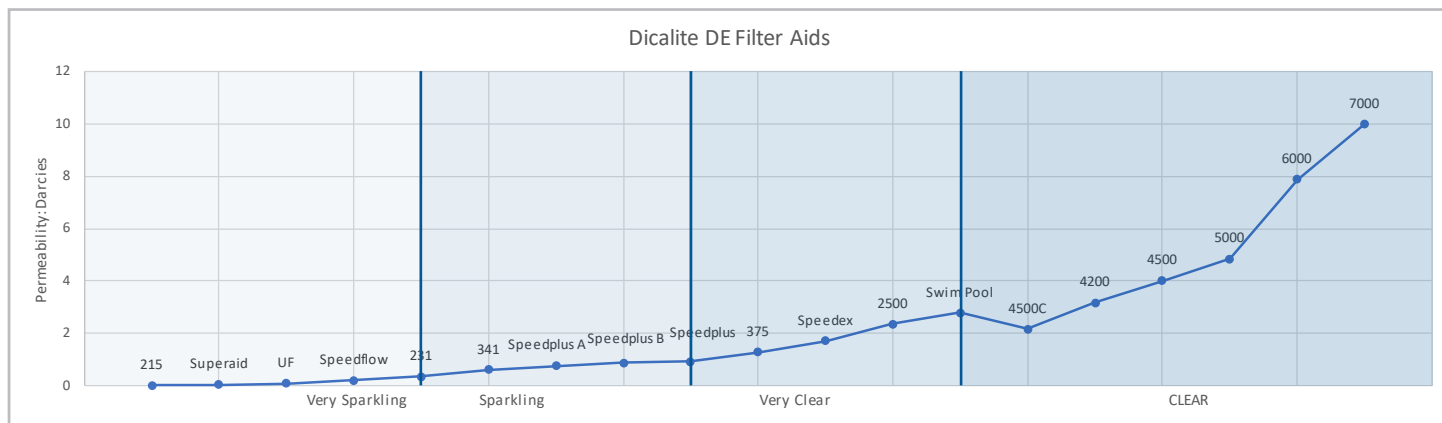
It's natural for ales, lagers, and other beers to produce a strong haze after the brewing process. Beers are filtered at some stage with diatomaceous earth to remove solids and other contaminants. Impurities need to be filtered down to the micron to prevent a hazy, unappealing look and taste. Diatomaceous earth removes these unwanted particles from beer without affecting the taste or color.

#### Dicalite Diatomaceous Earth (DE) Filter Aids

Dicalite Management Group offers over 30 different grades of DE, Perlite, and Cellulose filter aids to meet any industrial filter media process. Selection of the proper grade is critically important to ensure design, flow rate, clarity, and to maximize performance and minimize total filtration costs.

The following tables and graphs display filtration information, inherent properties, and specifications of Dicalite's DE filter aids.

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| Grade     | Type           | Location   | Color            | Particle Distribution |                |      |      |      |       |                       | Filtration Information             |                    |                       |             |                |                             |
|-----------|----------------|------------|------------------|-----------------------|----------------|------|------|------|-------|-----------------------|------------------------------------|--------------------|-----------------------|-------------|----------------|-----------------------------|
|           |                |            |                  | <10%                  | <25%           | <50% | <75% | <90% | <100% | Mean Particle, micron | Permeability, PFRV/Darcies (Range) | Permeability, PFRV | Permeability, Darcies | PCD, lb/ft3 | Micron Removal | Micron Removal (Calculated) |
| 341       | Flux Calcined  | Burney, CA | Off-White / Pink | 10                    | 16             | 26   | 41   | 60   | 410   | 35                    | 70-85 / 0.49-0.73                  | 77.5               | 0.61                  | 26          | <1.0           | 0.3                         |
| SPEEDPLUS |                |            | White            | 11                    | 19             | 33   | 56   | 112  | 948   | 57                    | 85-105 / 0.73-1.1                  | 95                 | 0.915                 | 26          | <1.0           | 0.5                         |
| 375       |                |            | White            | 12                    | 20             | 33   | 50   | 72   | 282   | 40                    | 105-120 / 1.1-1.45                 | 112.5              | 1.275                 | 23.1        | 1-2            | 0.6                         |
| SPEEDEX   |                |            | White            | 13                    | 23             | 39   | 66   | 131  | 1143  | 65                    | 120-140 / 1.45-1.96                | 130                | 1.705                 | 23.1        | 1.5-2.5        | 0.9                         |
| 2500      |                |            | White            | 16                    | 29             | 50   | 77   | 119  | 340   | 60                    | 140-165 / 1.96-2.73                | 152.5              | 2.345                 | 23.1        | <3.0           | 1.2                         |
| SWIM POOL |                |            | White            | 19                    | 35             | 60   | 96   | 160  | 1660  | 92                    | 140-190 / 1.96-3.61                | 165                | 2.785                 | 23.1        | 3-5            | 1.4                         |
| 4200      |                |            | White            | 8                     | 17             | 28   | 37   | 43   | 53    | 27                    | 165-190 / 2.73-3.61                | 177.5              | 3.27                  | 23.1        | <3.0           | 1.6                         |
| 4500      |                |            | White            | 23                    | 41             | 66   | 106  | 172  | 948   | 91                    | 190-210 / 3.61-4.41                | 200                | 4.01                  | 23.1        | <3.0           | 2.0                         |
| 5000      |                |            | White            | 22                    | 40             | 68   | 109  | 170  | 450   | 83                    | 210-230 / 4.41-5.29                | 220                | 4.85                  | 23.1        | <3.0           | 2.4                         |
| 6000      |                |            | White            | 25                    | 46             | 74   | 107  | 131  | 177   | 76                    | 260-300 / 6.76-9                   | 280                | 7.88                  | 23.1        | 5.0-6.0        | 3.9                         |
| 7000      |                |            | White            | 36                    | 59             | 93   | 138  | 195  | 948   | 112                   | 290-340 / 8.41-11.56               | 315                | 9.985                 | 23.1        | <7.0           | 5.0                         |
| 215       |                |            | Calcined         | Basalt, NV            | Reddish Orange | 4    | 9    | 20   | 53    | 160                   | 787                                | 60                 | < 16 / < 0.025        | 16          | 0.025          | N/A                         |
| SuperAid  | Reddish Orange | 3          |                  |                       | 7              | 13   | 23   | 37   | 92    | 17                    | 16-24 / 0.025-0.056                | 20                 | 0.0405                | N/A         | <0.5           | 0.0                         |
| UF        | Reddish Orange | 3          |                  |                       | 6              | 13   | 28   | 65   | 177   | 24                    | 24-36 / 0.06-0.13                  | 30                 | 0.095                 | N/A         | <0.5           | 0.0                         |
| SPEEDFLOW | Reddish Orange | 3          |                  |                       | 7              | 14   | 25   | 45   | 134   | 20                    | 36-52 / 0.13-0.27                  | 44                 | 0.2                   | 27.5        | <0.5           | 0.1                         |
| 231       | Pink Orange    | 8          |                  |                       | 12             | 18   | 29   | 45   | 84    | 22                    | 52-65 / 0.27-0.43                  | 58.5               | 0.35                  | 27.5        | <0.7           | 0.2                         |

### Filter Equipment

- Pressure Leaf
- Filter Press
- RVDF
- DE Swim Pool Filters

### Applications

- Beer
- Biodiesel
- Chemicals
- Concentrate Filtration
- Corn syrups
- Fine filtration
- Heavy Syrup Filtration
- Honey Filtration

- Mining Processes
- Oil Fluid loss recovery
- Oilseed Filtration
- Pharmaceuticals

- Sugars
- Sulfur Filtration
- Swim Pool Filtration
- Ultra fine filtration

- Waste Water Treatment
- Wine
- Wine Coarse Filtration

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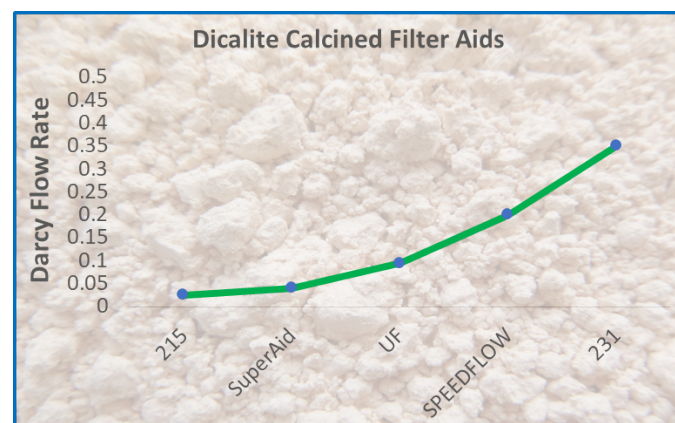
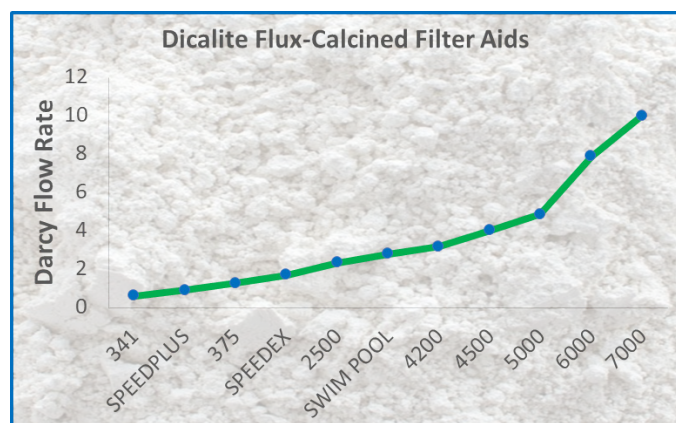
### Diatomaceous Earth

#### Dicalite Diatomaceous Earth (DE) Filter Aids

Dicalite Flux-Calcined DE provides the highest flow rates with the best possible clarity. Removal efficiencies vary depending upon customer application, equipment and process, however, it has been reported by one customer that Dicalite Speedplus removes particles down to 0.5um! Flux-Calcined DE is normally used on Rotary Vacuum drum filters and Filter-Press equipment where high solids loading, high flow rates, and excellent clarity are required. Flux-calcined DE is also used on vertical and horizontal leaf filters, and candle filters where higher flow rates are required. Filter aids are classified by permeability, which is normally expressed in Darcies. A Darcy is defined as the property of porous material which will allow a flow rate of 1ml of water under standard conditions through 1 cm<sup>2</sup> of area under one atmosphere of pressure.

Dicalite uses a unit termed PFRv (permeability flow rate by volume) to measure our filter aids. PFRv can easily be converted to Darcies, and we report both properties to our customers worldwide. It is important to note that a filter aid permeability value cannot be used to determine filter flow rate under process conditions in that, among other variables, it does not include the dominant effect of the particulate matter which is being filtered. In fact, changing to a faster flow rate filter aid will not always increase the flow rate on your industrial filter!

For more information on grade selection for your process, review the DE filter aids on page 6 of this guide and contact our Technical Services Department.



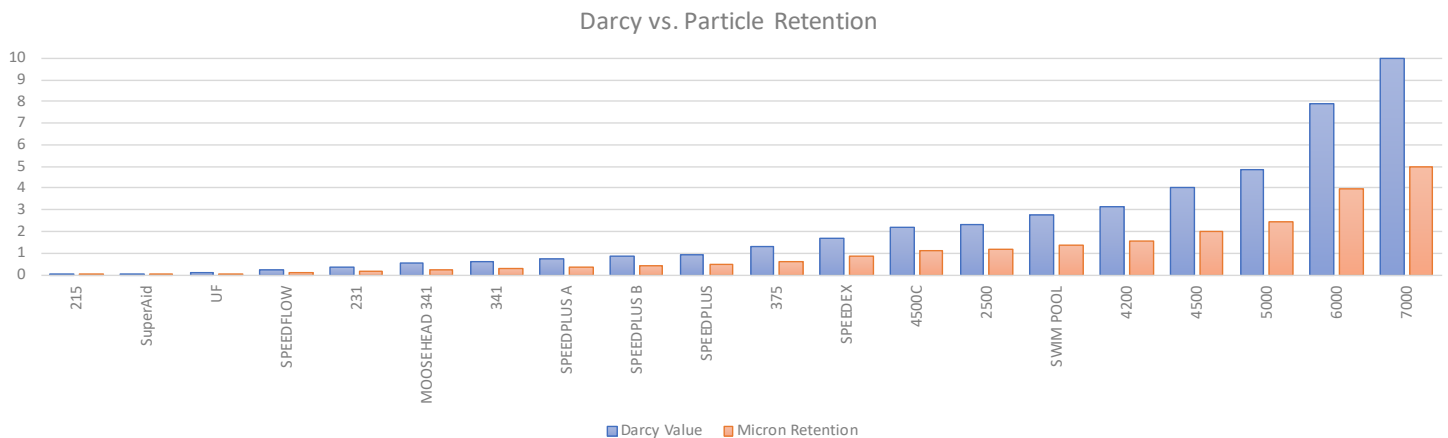
## A World of Filtration Experience

### Diatomaceous Earth

#### Pore Size Analysis

Pore size directly affects the removal efficiency of a filter aid. There are a number of methods to report the pore size of a filter aid including pore size by volume, and pore size by surface area. Usually results are reported in Median Pore Size (MPS) which means there are an equal number of pores smaller than the MPS as there are pores which are larger than the MPS. There are also other reporting parameters including average pore size and maximum pore size. Permeability, particle size, and pore size are all correlated for the same DE deposit. The slower

the permeability, the smaller the particle size, and the smaller the pore size. For example, the permeability, particle size and pore size for Dicalite Speedplus are all smaller than the same values for Dicalite 6000. Since all DE is unique and has unique morphology (size and shape), it follows that you cannot compare permeability, particle size, and pore size from one DE supplier to another. More specifically, you can compare permeability between vendors, but the particle size and pore size will be different for the same permeability values.



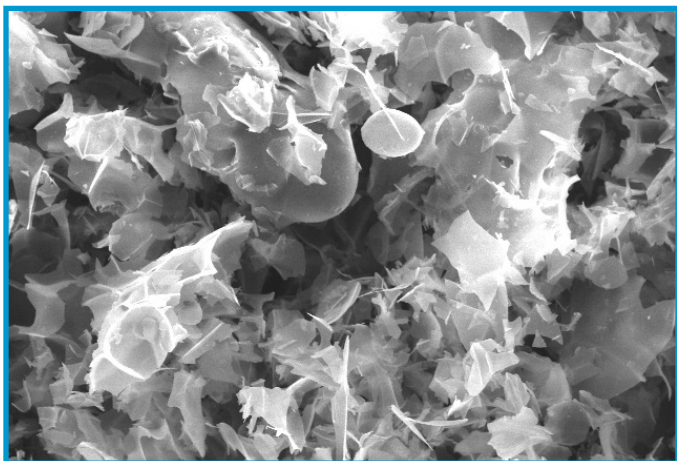
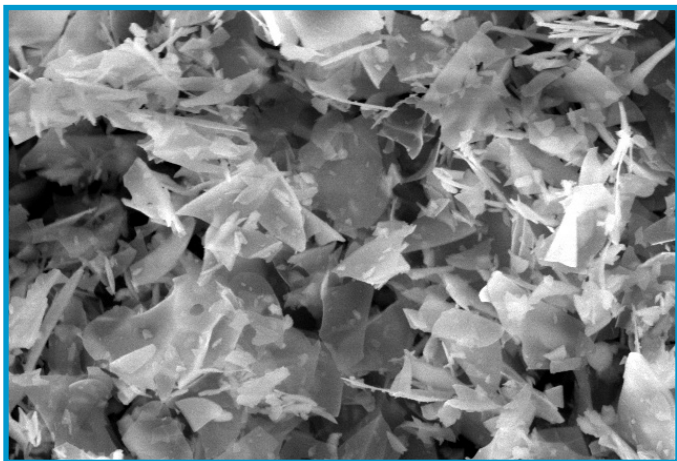
*In general, dividing the Darcy permeability value in half will result in the corresponding micron retention during filtration.*



## A World of Filtration Experience

### Perlite

Perlite is an amorphous mineral consisting of fused sodium potassium aluminum silicate. In its natural state, it's a dense, glassy rock formed by molten volcanic rock volcanic. When crushed and treated under proper conditions, perlite pops like popcorn, expanding up to 20 times its original volume.



### Why Perlite Is an Ideal Filter Aid

- It has extremely low solubilities in mineral and organic acids at both low and high temperatures.
- Perlite weighs less per unit volume than many other options. When compared to other filtration media, like Diatomaceous Earth, perlite offers comparable savings in filter aid usage, especially on rotary vacuum precoat filters.
- Perlite filter aid grades provide the user with a density advantage from 20 to 50% over other types of filter aids. Perlite filter aid dry density ranges from 100 to 200kg/m<sup>3</sup> (6 to 12lb/ft<sup>3</sup>), and the filter cake density range is 100 to 270kg/m<sup>3</sup> (7 to 17lb/ft<sup>3</sup>). In contrast, other filtration materials produce equal performance filter cakes in the range of 230 to 420kg/m<sup>3</sup> (15 to 25 lb/ft<sup>3</sup>).
- Perlite filter aids are processed at temperatures exceeding 1500 degrees Fahrenheit, which eliminates organic matter.

## A World of Filtration Experience

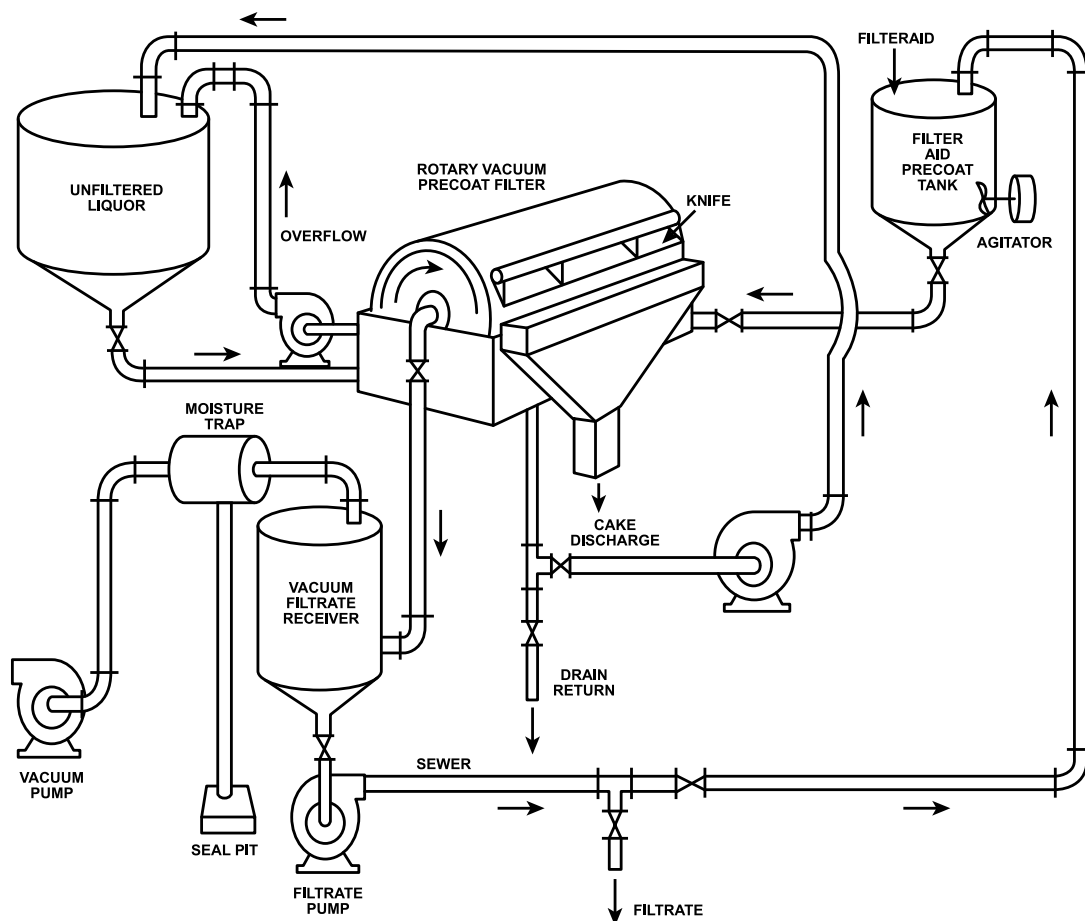
### Perlite

#### Usable with Standard Equipment

Perlite filter aids can be used with either pressure or vacuum filtration equipment. Perlite generally replaces other filter aids on a one-to-one volume basis. For example, a cubic measure of perlite will replace the same volume of other filter aids. Selection of the optimum grade and dosage may require assistance from technical services and in-plant trials.

#### Easy Cake Release

Additional benefits of perlite filter aids come at the end of the filter cycle. Perlite filter cakes remain porous and do not compact. Filter cakes built up under pressure release easier when perlite is used. This release facilitates easier cleaning, potentially reduces manpower requirements and costs, and increases productivity. The lower weight of perlite filter cakes may also reduce disposal costs.



## A World of Filtration Experience

### Perlite

#### A Variety of Grades

Productivity, clarity, and flow rates may be increased through the use of perlite filter aid grades. At Dicalite, we produce perlite filter aid grades ranging from 0.13Darcies to 3Darcies. A material with a permeability of 1Darcy passes 1mm/second per square centimeter of a liquid of 1cP viscosity (approximately that of water)

through a cake 1cm thick at a differential pressure of 1atm. The higher flow grades are especially applicable to use with highly viscous liquids such as syrup, resins or gelatinous slurries. These traits are accomplished during the liquid's path through the channels created by the jagged, interlocking particles.

| Product   | Dicalite Production Facility | Type           | Color          | Permeability (PFRV) | Permeability (Darcies) | Float (ml) | PCD (cake density) lbs/ft3 (max) | 40Mesh Screen (max. Retain %) | 140Mesh Screen (max. Retain %) | MPD (Median Particle Size-Typical um) | Type of Filter Equipment required  | Common Filtration Applications   |
|-----------|------------------------------|----------------|----------------|---------------------|------------------------|------------|----------------------------------|-------------------------------|--------------------------------|---------------------------------------|------------------------------------|--|
| 416T      | Thomaston, ME                | Perlite Filler | White/ Greyish | NA                  | NA                     | NA         | NA                               | Trace                         | 0.2                            | <10                                   | NA                                 | Fine Filler, Catalyst Carrier, Polishes                                    |
| FF416/416 | Crawfordsville, IN           | PFA            | White/ Greyish | <35                 | <0.13                  | 14         | NA                               | Trace                         | 0.2                            | 25-35                                 | Candle/ Pressure Leaf              | Beer body feed, Seed Coating, Poly Filler                                  |
| FF426/426 | Crawfordsville, IN           | PFA            | Off-White      | 35-50               | 0.13-0.25              | 16         | 16-26                            | Trace                         | 0.2                            | 25-35                                 | Candle/ Pressure Leaf              | Beer body feed, Seed Coating   |
| FF436/436 | Crawfordsville, IN           | PFA            | Off-White      | 50-65               | 0.25-0.43              | 22         | 18.5                             | 1                             | 7                              | 30-35                                 | Candle/ Pressure Leaf              | Cutting Water/Oil Recycling, Seed Coating, Texturing Paints                |
| FF456/456 | Crawfordsville, IN           | PFA            | Off-White      | 65-80               | 0.43-0.64              | 30         | 17                               | 1                             | 10                             | 35-40                                 | Candle/ Pressure Leaf              | Texturing as a Filler  |
| FF476/476 | Crawfordsville, IN           | PFA            | Off-White      | 80-95               | 0.64-0.9               | 35         | 17                               | 2                             | 14                             | 40-45                                 | Candle/ Pressure Leaf/Filter Press | Beet Sugar, Waste Water Filtration   |
| 476SP     | Crawfordsville, IN           | PFA            | Off-White      | 95-105              | 0.9-1.1                | 40         | 16.5                             | 2                             | 15                             | 40-45                                 | Candle/ Pressure Leaf/Filter Press | Beet Sugar, Beer Precoat, Waste Water Filtration, Activated Carbon Removal |
| 4106      | Crawfordsville, IN           | PFA            | Off-White      | 105-120             | 1.10-1.44              | 45         | 16.5                             | 2.5                           | 20                             | 45-55                                 | Pressure Leaf/Filter Press/RVDF    | Beet Sugar, Waste Water Filtration, Activated Carbon Removal               |
| 4156      | Crawfordsville, IN           | PFA            | Off-White      | 120-140             | 1.44-1.96              | 50         | 16                               | 2.5                           | 30                             | 50-60                                 | Pressure Leaf/Filter Press/RVDF    | Process Chemical Filtration, Oil Completion Fluids, Waste Water Filtration |
| LD1006    | Crawfordsville, IN           | PFA            | Off-White      | 95-130              | 1.1-1.69               | 85         | 13.5                             | 2.5                           | 30                             | 60-75                                 | Pressure Leaf/Filter Press/RVDF    | Process Chemical Filtration, Oil Completion Fluids, Waste Water Filtration |
| LD1106    | Crawfordsville, IN           | PFA            | Off-White      | 120-150             | 1.44-2.25              | NA         | 11.5                             | 3.5                           | 50                             | 65-80                                 | Pressure Leaf/Filter Press/RVDF    | Corn Syrups, Chemical Filtration   |

## A World of Filtration Experience

### Perlite

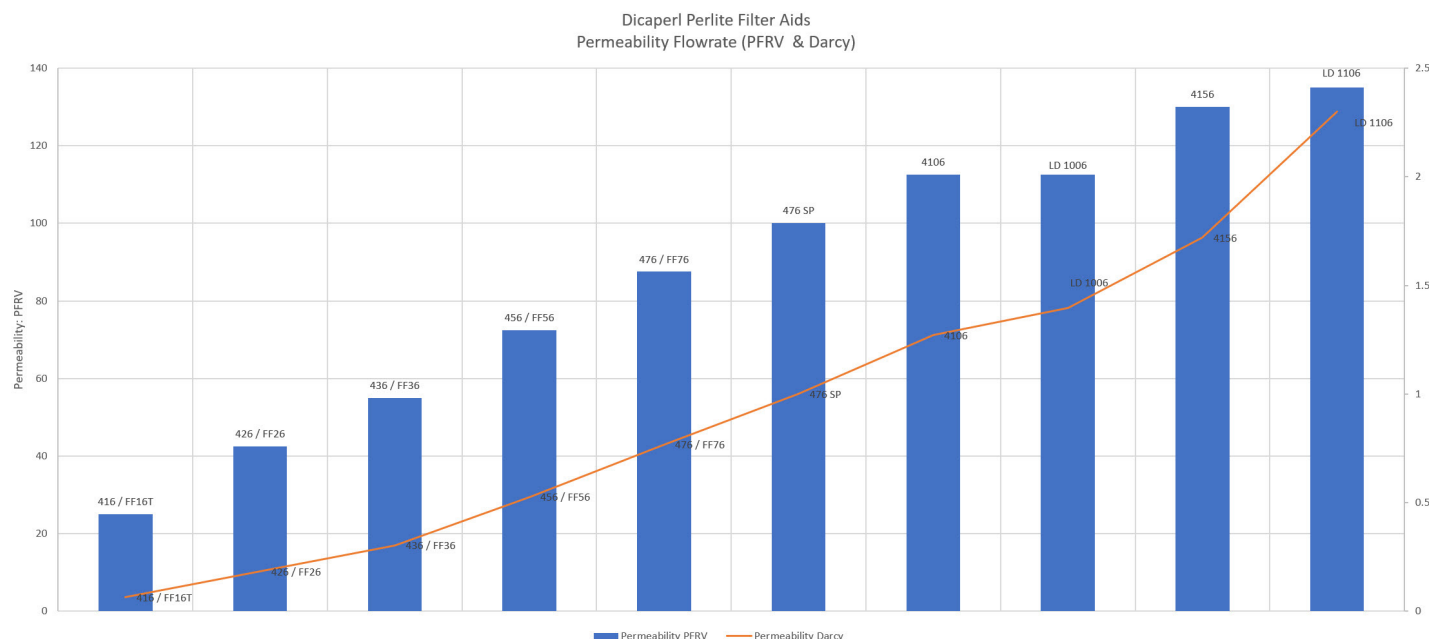
#### Perlite Filtration Applications

Perlite's low density, availability, performance, cost, inert nature, and environmental footprint make it an essential filtration aid in many industries, including:

- Food Production
- Chemicals
- Paint and coatings
- Environmental
- Beverage Filtration
- Pharmaceutical
- Industrial

#### Food and Beverage

Perlite filter aids are both sterile and inert and are used for filtering liquids in the beverage, food, and pharmaceutical industries. No tastes, colors or odors are imparted. Perlite meets the standards listed in the Food Chemicals Codex (published by the United States Pharmacopeia), deeming it safe for its intended use.



*\*The Food Chemicals Codex is regarded as a source of information on the quality and purity of food grade substances, and is regarded as authoritative by many government agencies throughout the world.*

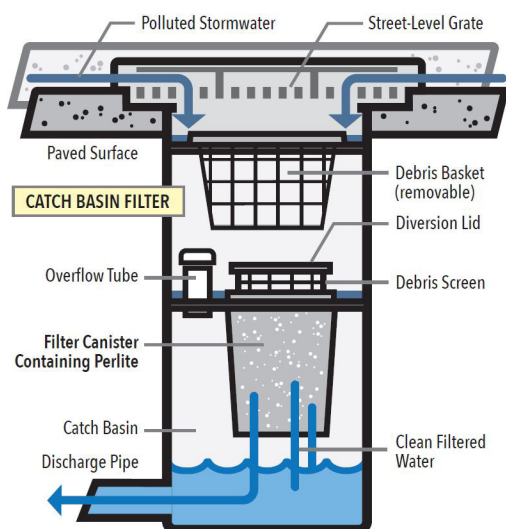


## A World of Filtration Experience

### Perlite

#### Storm Water Filtration – Protecting our Waterways

Developed by the Washington State Department of Transportation, Roadside Media Filter Drains combine horticultural-grade perlite, dolomite, and agricultural gypsum held in place by crushed rock. This filter media is placed around roadways to filter suspended solids and other pollutants from roadway runoff. Catch Basin Filters made with various filtration media, including expanded perlite, are used to remove contaminants from stormwater runoff before being released to local sewer systems and waterways.



*A cross-section of a storm drain showing roadway runoff being purified before discharge by a filter canister containing perlite.*



#### Cost Savings

Perlite filter aids provide the user with a density advantage of from 20-50% over other filter aids which is an important consideration when comparing costs. Perlite filter cake density is only 110 to 270 kg/m<sup>3</sup> (7 to 17 lb/ft<sup>3</sup>). The dry density of perlite filter aid ranges from 100 to 200 kg/m<sup>3</sup> (6 to 12 lb/ft<sup>3</sup>). Experience in a variety of applications in many industries has shown that users of filter aids can substantially reduce filtration costs without sacrificing performance by converting to perlite filter aids.

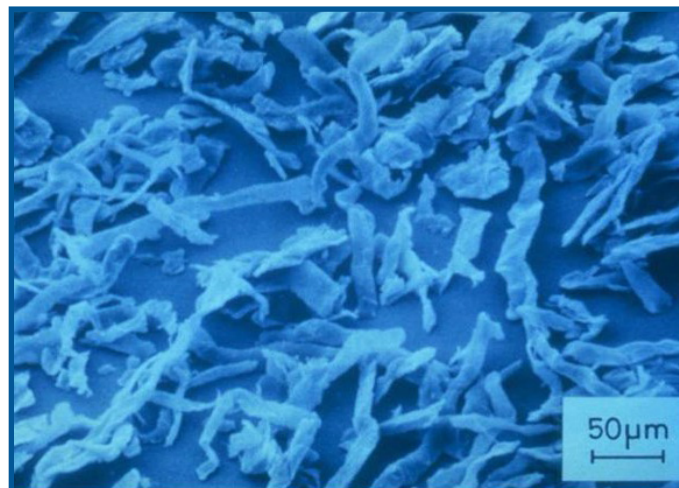
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### Cellulose Filter Aids: Dicalite's Dicaflock

Dicaflock is Dicalite's powdered cellulose obtained from mechanically disintegrated cellulose, which is prepared by processing bleached or unbleached cellulose obtained as a pulp from fibrous materials like wood or cotton. It occurs as a white, odorless substance and consists of fibrous particles that disperse rapidly in water.

Dicaflock cellulose filter aids are used when fibers are essential or the chemistry of the filtration demands cellulose. In the production of cellulose filter aids, the pulp is thoroughly purified, then it is specially processed to give good filtration characteristics in a wide range of grades. It is essentially pure cellulose, practically ashless, and non-abrasive.

Dicaflock cellulose filter aids are widely used in filtering plating solutions and chemicals where soluble silica is undesirable. The purity and combustibility offer a distinct advantage in recovering catalysts by filtration. The same advantage holds in metallurgical filtration for recovering rare metals. Dicaflock filter aids are extensively used for filtration of steam condensate from boiler operations.



In most cases, cellulose is used as a precoat on the filter septum for fixed bed filtration. It creates a porous mat or paper-like layer on the filter screen or cloth. The fibers bond together, providing a fairly rigid medium. The fibers readily bridge even the coarsest septum openings to build up a precoat in a minimum amount of time. Such a precoat will not crack under usual pressure changes, will plug small leaks under the filter septum, and often remain on the septum when the pump is stopped.

While cellulose is often used as a precoat it's seldom used as a standalone body feed. Dicalite's perlite and Diatomaceous Earth filter aids are recommended to be used as the primary body feed although they can be mixed directly with cellulose filter aids.

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### Rotary Vacuum Precoat

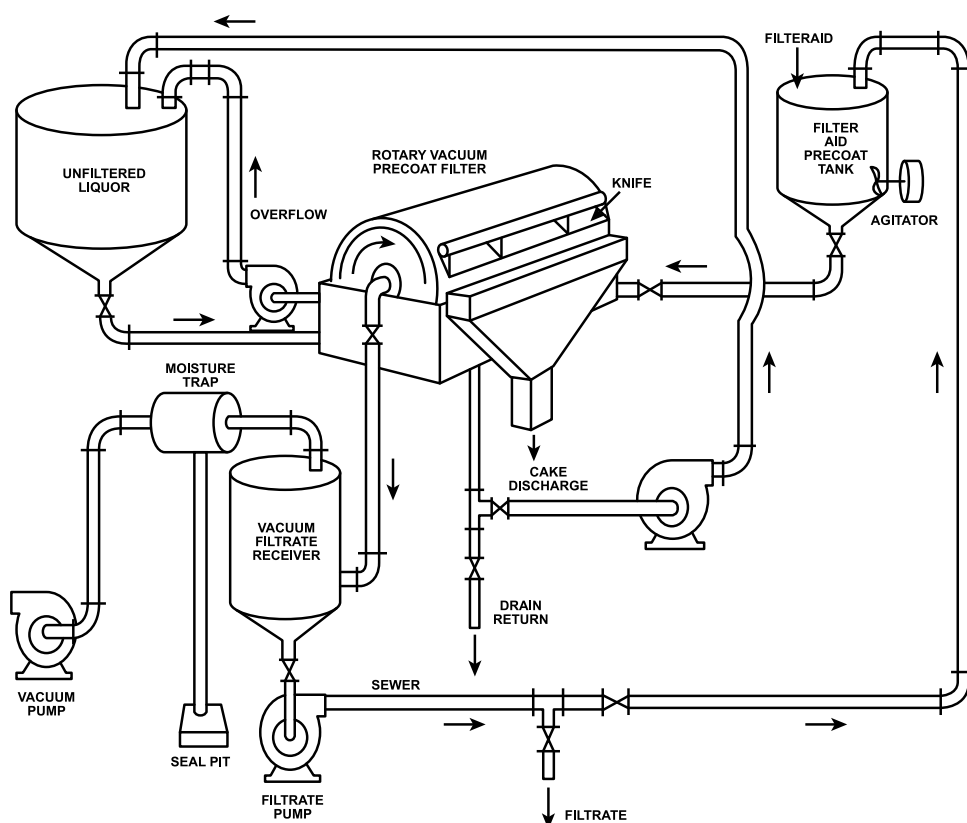
Rotary vacuum precoat filters are typically used for thick, difficult-to-filter liquids or when the solids content is high. The precoat is formed on a drum with a cloth or metal-septum by recirculated a 2% to 5% filter aid slurry. A 2" to 4" cake can be applied in an hour or less.

During the operating cycle, the process fluid passes through the cake, leaving solids on the precoat surface. A mechanically operated knife blade continuously shaves off the filterable solids and leaves a clean filtering surface. Selection of the proper depth of cut depends mostly on the nature and quantity of the solids. Cycle lengths vary from eight to 24 hours, determined by the depth of cut and cake thickness.

Flow rates are, for the most part, dictated by the filter aid solids and liquor viscosity. Common drum speeds range from one to 1/5 revolutions per minute. The optimum grade and type of filter aid is the grade that maintains the solids on the surface of the cake. Optimum clarity occurs when solids are retained at the precoat surface.

#### Considerations:

- Too rapid precoating rate and too high filter aid concentration can cause excessive cake cracking.
- The septum should be kept clean, as it can be a source of cake cracking and non-uniform thickness.



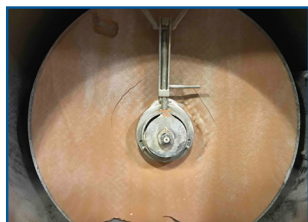
## A World of Filtration Experience

### Pressure Filtration Guide

#### Filter Septum Requirements

The filter septum serves principally as the support for the filter aid cake, and the effect of the septum on the performance is sufficient to warrant careful selection. Considerations include:

- **Size:** It should be fine enough to retain the filter aid particles and allow a firm cake to be formed quickly, while also giving a minimum resistance to flow.
- **Material:** It must be able to withstand chemical, pressure, and temperature conditions existing during filtration. The two most widely used septa are metal (24x110 Dutch Weave) and cloth.



#### Precoat

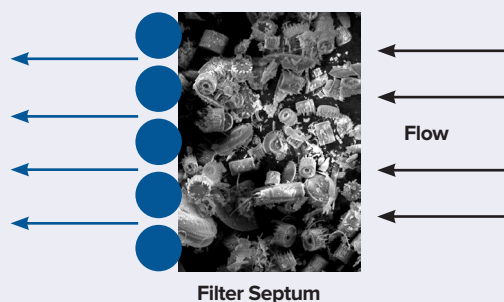
In most cases, the first step of filtering is the formation of the precoat. This thin layer—1/16" to 1/8"—protects the septum and ensures clarity by stopping the solids at the surface. The filter aid grade used for the precoat must be carefully selected to allow the fastest possible flow, yet trap the solids.

The filter aid should be added at 10 to 25 lbs/100 feet squared of filter area. The precoat is formed by recirculating the filter aid slurry through the filter. This slurry is made from the filtered fluid or water and a filter aid. The concentration should be as low as possible; 0.5% is typical.

A precoating rate of 1 GPM/foot squared is typical. Higher viscosity liquids, like honey and syrup, require lower rates. There should be at least 1 psi differential pressure during the precoat process. Precoating liquid should clear up within 10 to 15 minutes.

Agitation in the precoat tank should be sufficient to keep the filter aid in suspension, however, excessive agitation for an extended time may break down the particles.

DE bridges the screen openings and forms a precoat





## A World of Filtration Experience

### Pressure Filtration Guide

#### Body Feed

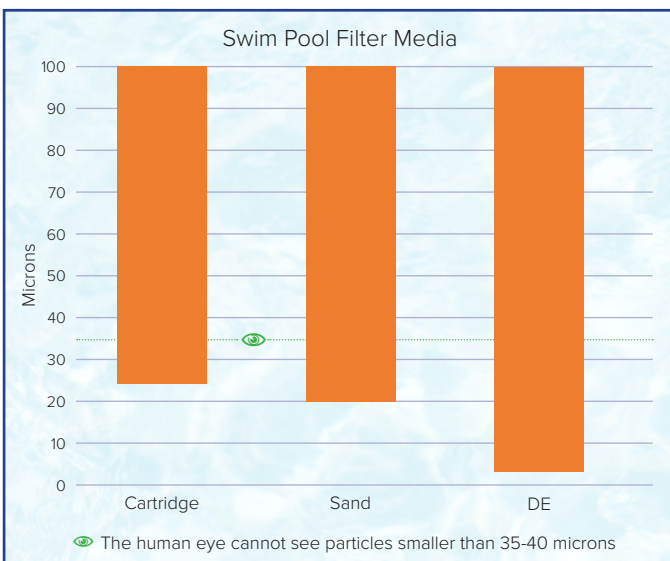
The addition of the filter aid to the fluid is referred to as body feed. Carefully choosing the type, grade, and quantity of filter media is important to obtain the highest filtration flow rate consistent with the clarification required.

Filter aid dosage varies with the solids content and other variables specific to each application. In general, a dosage of 1/2 of the percent of solids by weight is adequate. Bodyfeed can be added directly to the tank of fluid to be filtered or dosed from a slurry tank into the filter inlet.

#### Grade Selection

Clarity is considered by many engineers to be the most important measure of efficiency in filter aid filtration. A high-quality filter aid is critical for uniform results day after day. Selection of the particular type and grade of filter aid having the correct particle size and distribution is a major factor. Other considerations include:

- The quantity of filter aid to be used
- Flowrate needed to meet plant production schedules
- Equipment limitations
- General filtration conditions



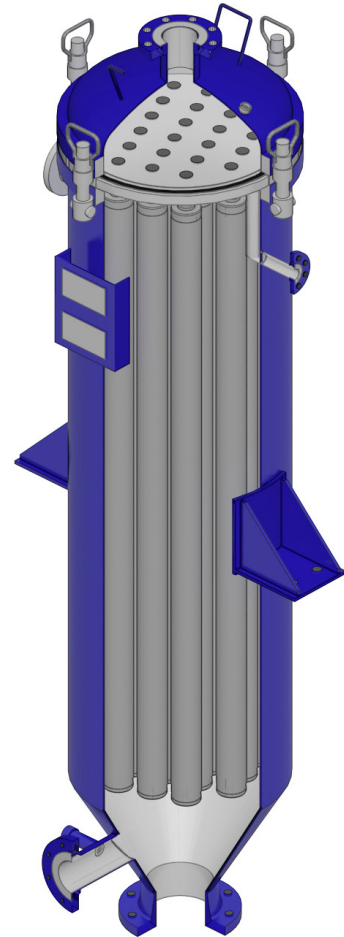
Diatomaceous Earth filter media is the most efficient type of filter media available to pool owners. It can trap particles down to 3-5 microns; (well below the naked eye can see which is around 35 microns) removing particles up to 10 times smaller than what a typical sand filter will remove!

## A World of Filtration Experience

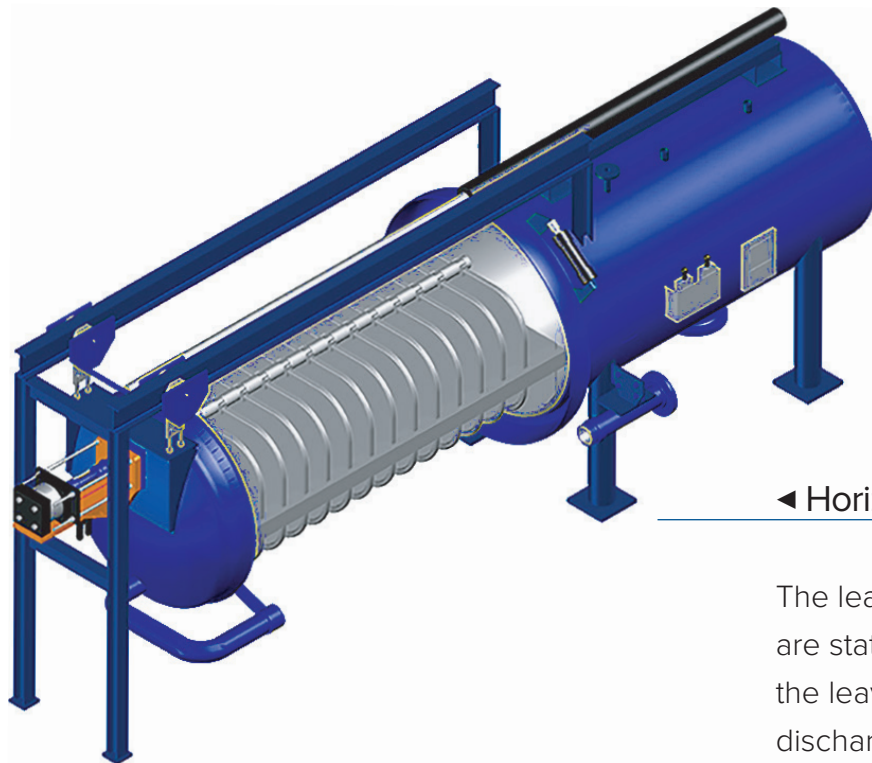
### Types of Filters

#### Pressure Filter ►

The tube filter is a vertical tank filter with tubes suspended from a tube sheet. Filter cake is formed on the outside of the tube and filtrate flows up through the tube into the head and out. The tubes are cleaned by high rate backwashing often assisted by a hydraulic “pump”.



#### ◄ Horizontal Leaf Filter



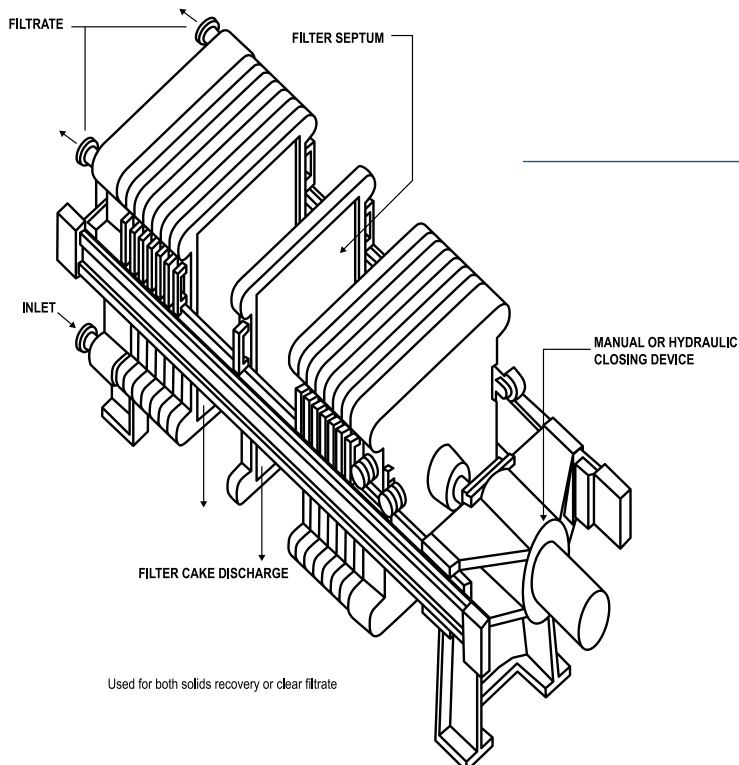
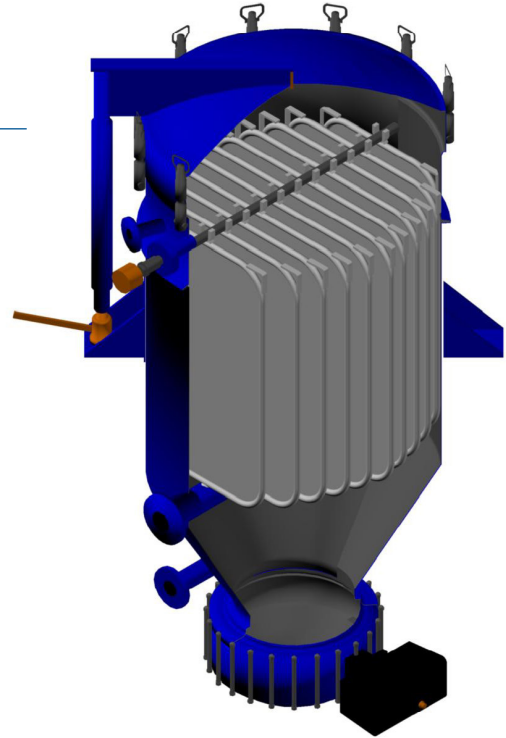
The leaves in this filter rotate during cleaning but are stationary during filtration. For wet discharge, the leaves rotate past a sluice nozzle. For dry discharge, the cake is removed by vibrating the leaves or by rotating them past a scraper or a brush and the released cake is a screw conveyor.

## A World of Filtration Experience

### Types of Filters

#### Vertical Leaf Filter ►

This filter has small floor space requirements, but must have sufficient head room for removal of the leaves. It has a high ratio of filter area to filter shell volume. It can be made as a wet discharge sluicing filter (as shown) or as a dry cake discharge filter with leaf vibrators.



#### ◄ Filter Press

The filter press has numerous versions. The illustration shows one with caulked-in metal septa with recessed cake space. Other types have flush plates dressed with paper or cloth separated by open frames where the cake is formed. The presses may be automated. Some operate up to 250 psi (18 atm). The filter is used where dry cake discharge is required and in systems where no dangerous or toxic fumes exist.

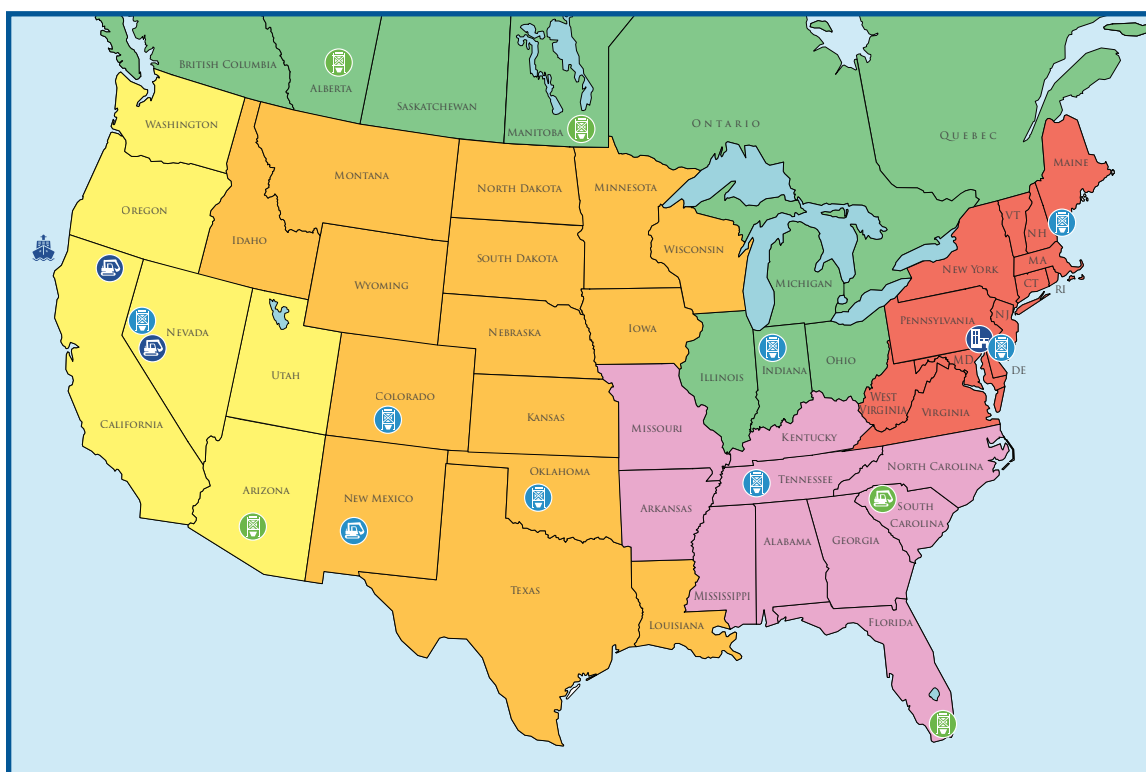
## A World of Filtration Experience

### DMG Satisfies the World's thirst for DE and Perlite Filter Aids

While you're deciding which filter aid best meets your needs, consider which supplier will meet your needs, too. Dicalite Management Group is the leading vertically integrated mineral filter aid supplier in North America and Europe. Our team has helped companies all around the globe choose the right mineral filter aid for nearly 100 years. DMG operates the largest filter aid plant in all of Europe and the fourth oldest continuously running mine in Nevada.

We help guide you to success by focusing on the below requirements:

1. Economy
2. Faster flow rate
3. Longer filter cycle
4. Better clarity
5. Uniformity



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*Dicalite has 16 facilities across North America and Europe: four mines and 12 facilities that refine, process, manufacture, and package our products. With an unequalled number of geographically dispersed processing sites and large ore reserves, DMG is able to provide better, faster, and consistent service for our customers.*



## A World of Filtration Experience

### Industry Leading Fresh-water Deposits

#### Dicalite's Diatomaceous Earth

Dicalite's Diatomaceous Earth filter aids offer outstanding performance, from the finest to the coarsest grades. These materials meet all requirements for good filter aids, enabling them to meet the exacting clarity and flowrate demands of industrial filtration. Even more importantly, the user can depend on consistency and uniformity load after load.

#### What makes our ore different?

##### **Burney, California: Calcined & Flux-Calcined:**

Burney is regarded as one of the purest fresh-water Diatomaceous Earth deposits in the world. At Burney, there are two freshwater diatoms: a disc-shaped diatom called *Stephanodiscus* and a tubular shaped diatom called *Melosira*. These diatoms first appeared in the fossil record during the Cretaceous Period (70 to 135 million years ago). Due to metamorphism and diagenetic changes, most commercial deposits are limited to Tertiary deposits. The diatoms in the Pit River deposit are late-Pliocene to early-Pleistocene, estimated to be 0.75 to 3 million years old.

**Basalt, Nevada: Natural & Calcined:** The Basalt mine is the fourth oldest continually operated mine in the state of Nevada. At this mine, the three most prevalent diatoms are *Melosira*, *Stephanodiscus*, and *Eunotia*. Basalt's natural deposit is continually revered for its consistent product and low arsenic levels compared to other natural deposits on the USA's West Coast. In 2018, Dicalite Management Group made various capital investments, totaling over \$1MM, resulting in noteworthy increases to capacity and thus efficiencies across numerous plant components.



## A World of Filtration Experience

### North America's Largest Producer of Perlite Ore and Filter Aids

#### Dicalite's Perlite

A special milling and classification process gives Dicalite perlite filter aids the structure and correct particle size range distribution needed for optimum performance. Our amorphous perlite filter aids show superior performance in rotary vacuum filtration with proven advantages in filter aid usage and resistance to cake cracking.

#### What makes our ore different?

##### **Socorro, NM**

The perlitic dome that Dicalite Management Group has developed in Socorro, New Mexico is one of the premier deposits in the world. Socorro is surpassed in size only by the No Agua perlite deposit in northern New Mexico, where DMG also owns a companion mine. DMG invested millions from 2017-2018 in equipment, infrastructure, and processing to ensure constant improvement of the processes.



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## A World of Filtration Experience

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### The Dicalite Management Group Advantage

When you choose Dicalite Management Group for your filtration needs, you get:

- 1. Multi-Layered Help Along the Way:** Our dedicated sales and technical services teams work together to provide you with the right mineral recommendation to ensure your product is free of contaminants and unwanted solids.
- 2. Variety:** DMG offers Diatomaceous Earth, perlite, and cellulose in a complete range of grades.
- 3. Consistent Quality:** Every order is lab-checked to ensure quality and consistency with each truckload.
- 4. Technical Assistance:** Our technical services team is always ready to support your filtration needs and answer any questions that may arise.
- 5. Dependable Delivery:** Whether you buy truckloads of product through us or bags through our extensive distributor network, you're assured delivery when and where you want it.
- 6. The right product for your needs:** DMG stands by our product recommendations, so in-plant trials are encouraged with the support of our technical team.
- 7. Local Service:** DMG is the most vertically integrated supplier of diatomaceous earth and perlite in the industry. This means more facilities at closer distances to our customers and local customer service. You will always have a dedicated plant-specific customer service representative to assist with every order.

**Call Today at 866-728-3303 or Contact your  
Regional Sales Manager Today for a Free Sample**