



Gulf Perlite L.L.C: Perlite Filter Aid – Technical Brochure



(Gulf Perlite Filter Aid)

What is Perlite?

Perlite, an igneous rock, is formed by the hydration of rhyolitic obsidian, a rock which is the result of rapid chilling of molten high silica rhyolitic lava. The distinguishing feature which sets perlite apart from other volcanic siliceous rocks is that when heated above 800°C, it expands up to 20 times its original size, becoming a lightweight expanded material. This expansion is due to the presence of water trapped within the crude ore.

Advantages of Perlite Filter Aids:

- **Easy to handle**
- **Non-toxic / non-carcinogenic**
- **Environmentally friendly and safe to use**
- **Economical – offers twice as much filtration pound for pound**
- **Lightweight – up to 50% density advantage**
- **Easy cake release**
- **No color, taste or odor**
- **Usable with standard filter equipment**
- **Chemically inert**

Gulf Perlite Filter Aids:

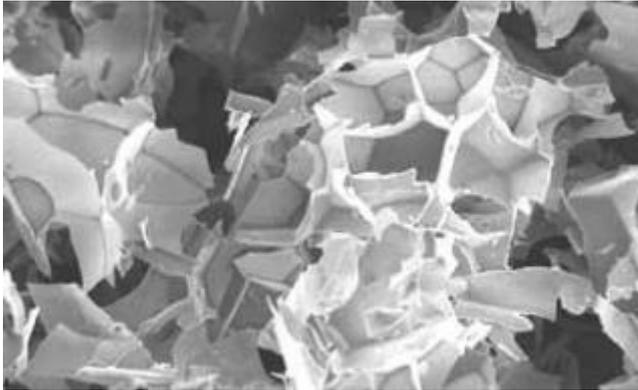
Gulf Perlite offers consistent delivery of Perlite Filter Aid depending on customer requirement by controlling the chain of processing direct from the ore. Carefully selected Perlite is transported to our state of the art modern facilities in the Jebel Ali, Dubai.

The Perlite ore is subjected to rapid heating above 800°C under carefully controlled conditions. As a result the Perlite structure ‘pops’ consequence of the build-up of internal pressure due to combined moisture forming a multi-cellular, irregular glass bubble structure. These glass bubbles are further milled to varying particle sizes to form perlite filter aids.



With its unique morphology, expanded milled Perlite has excellent properties for removal of difficult to filter suspended solids due to its jagged interlocking structure (Fig.1). In addition, its light density allows Perlite filter aids to retain large volumes of suspended solids while maintaining excellent permeability.

Figure 1:



The Benefits of Perlite as a Filter Aid

Perlite filter aids are lightweight, inert, impart no taste or odour to liquids being filtered and are virtually insoluble in mineral and organic acids at all temperatures. Solubility in strong alkaline solutions varies depending on temperature and contact time. Without using a filter aid the solid particles in the liquid will soon accumulate on filtering surfaces and block them.

A perlite filter aid makes a filtering layer (cake) that transfers the actual filtering from the septum to the whole mass of filter aid. Filtration occurs in the tiny pores formed by the fine particles of filter aid.

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 cleaning, potentially reduces manpower requirements, and increases productivity. The lower weight of perlite filter cakes may also reduce disposal costs.

Inert Nature of Perlite

Gulf Perlite filter aids are both sterile and inert and are used for filtering liquids in the beverage, food and pharmaceutical industries. No tastes, colours or odours are imparted, and, subject to meeting the standards listed in the Food Chemicals Codex (published by the United States' National Academy of Sciences), are deemed safe for their intended use.



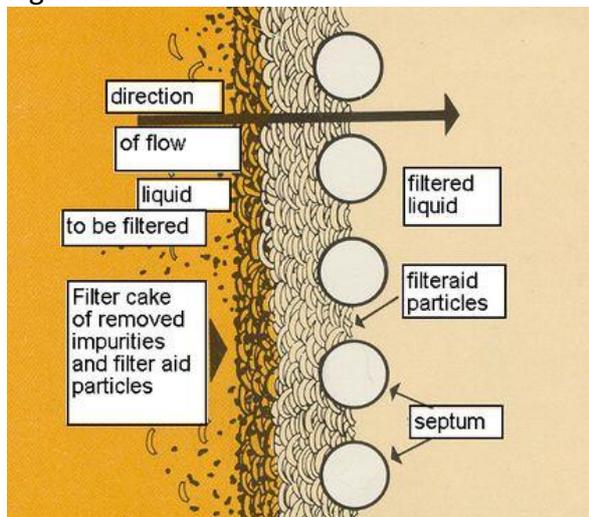
Perlite Filter Aids in Pressure Filtration

Solid / liquid separation with perlite filter aids on pressure type filter systems are a two-step process.

Precoat Formation

First step is the formation of precoat (Fig.2). It is a thin layer, 1.5 to 3.0 mm (1/16 - 1/8 inch), which protects the septum and ensures clarity by stopping the solids at the surface. The filter aid grade used for precoat must be carefully selected to allow the fastest possible flow yet trap the solids. Slurry is made from filtered liquid, or sometimes water, and filter aid. The filter septum serves as a support for the perlite precoat and does not function to remove particulates from the liquid.

Figure 2:



The amount of Perlite filter aid required to produce a precoat cake is between (400 – 1200 g/m²) of filter area. Systems with larger surface area may require a higher precoat rate to achieve a fully covered filter area. The precoat is formed by recirculating the filter aid slurry through the filter. The coarser particles deposit themselves first on the septum followed by smaller ones.

Functions of the Precoat

- Establish immediate filter clarity
- Prevent binding of the filter septum
- Prolong septum life
- Enhance filter cake release
- Reduce filter clean up time
- Maintain filtrate clarity throughout the filtration cycle



Dual Precoat

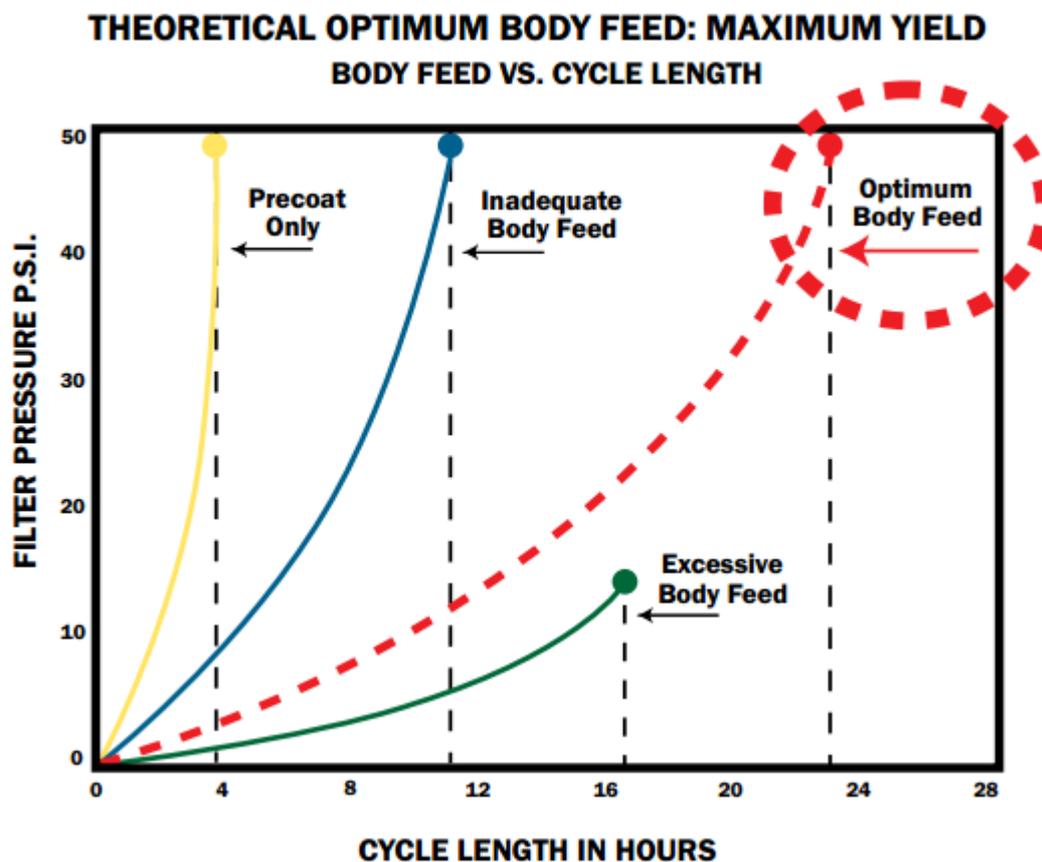
In order to optimize filtration the use of two separate types of Perlite filter aids can also be used, the initial primary precoat being of a coarser grade offering a fast flow whilst a finer grade of secondary perlite achieves better clarity. This method prevents the bleed through of finer grades and typically improves filter flow rates compared to single grade precoat.

Bodyfeed

Bodyfeed is the continuous addition to the unfiltered liquid being filtered in order to keep the dirt solids apart; this in turn maintains a porous cake. Bodyfeed maintains clarity and flow rate throughout the filter run, hence the type and grade of Perlite filter aid used is important to ensure optimum performance. Bodyfeed is added directly to the tank of the liquid to be filtered, or dosed from a slurry tank into the filter inlet. The correct dosage of Bodyfeed will significantly increase yield and offer the longest cycle length.

The graph (Fig 3.) demonstrates the influence of inadequate body feed, optimal body feed and excessive body feed. Optimal bodyfeed addition rates will depend on the type and amount of solids being filtered.

Figure 3:

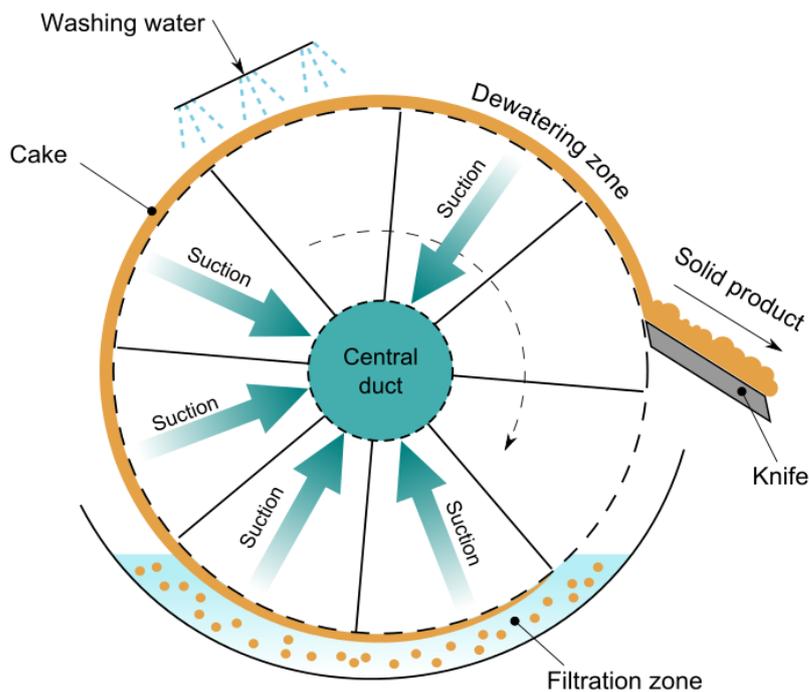




Perlite Filter Aids in Vacuum Filtration

The use of Rotary vacuum-drum filter (Fig 4.) is well suited to slurries, and liquids with a high solid content, which could clog other forms of filter.

Figure 4:



Precoat Formation

The precoat is formed on a drum with a cloth or metal-septum by recirculating 2 - 5 % filter aid slurry. During the operating cycle, the process liquid passes through the cake leaving the solids on the precoat surface. Flowrates are dictated by the filter aid solids and liquor viscosity. The optimum grade and type of filter aids is the grade which will maintain the solids on the surface of the cake.

The Advantages of the Rotary-Vacuum Dryer Filter

- The rotary vacuum drum filter is a continuous and automatic operation, so the operating cost is low.
- The variation of the drum speed rotating can be used to control the cake thickness.
- The process can be easily modified (pre-coating filter process).
- Can produce relatively clean product by adding a showering device.