Drilling slurries are fluids used in excavations for civil engineering, construction and oil and gas extraction. Their basic purpose is to help make drilling fast and safe. They typically use water or oil as their base fluids. This type of slurry cannot be toxic, corrosive or inflammable but must be inert in the event of contamination by soluble salts or minerals. It must also be thermally stable, retain its properties in accordance with operational demands and remain immune to the development of bacteria.

**Main functions**
Cleaning, removing and recovering waste; controlling the pressure in a geological formation; suspending and flushing out materials; sealing up permeable formations; maintaining the stability of the sides of the hole drilled; minimising damage to the geological formation; cooling and lubricating the column and drilling gear; transmitting hydraulic power to the drill bit; containing fluids from the geological formation which mix with it (water, gases, oil, etc.); controlling corrosion; facilitating laying foundations and finishing; minimising impact on the environment.

**Types**
Drilling fluids are classified depending on the type of base: either a water-based fluid or an oil or synthetic-based fluid. The most widely-used slurries are water-based, and these in turn are subdivided into bentonite slurry and polymer slurry.

In water-based slurry, water makes up the medium for suspension of solids and forms the continuous phase. Oil-based slurry, on the other hand, features an emulsion of water in oil, i.e. an inverse emulsion where...
the dispersed phase is the water and the continuous phase, and the filtrate, is oil. The water is not dissolved or mixed with the oil but remains suspended, each drop acting like a solid particle.

**Bentonite slurry and its uses**
This is a mixture of bentonite and water. Bentonite is a type of montmorillonite* clay with a very high liquid limit. This means that even if a lot of water is added to it, the mixture does not lose its stability or consistency.

Bentonite slurry has a very important property which makes it very useful in construction: when a slurry of this type is mixed without there being any variation in water it loses strength, behaving like a fluid. However, it regains this strength when it is left to stand.

The main use of bentonite slurry is connected with excavation. When digging a trench (drilling into ground of low consistency with a risk of collapse, normally to build walls or piles), bentonite slurry stops the sides of the trench caving in.

While the trench is being dug, it is filled up with slurry: as it is constantly moving, it has little consistency and behaves like a fluid. However, when stirring stops, the viscosity of bentonite slurry increases and it gains the necessary strength to stop the walls of the excavation falling in under pressure.

In excavation work it also often serves to remove detritus from the ground. This is done by constantly recirculating the bentonite slurry.

*Bentonite slurry tank

*Montmorillonite is a mineral in the silicate group, phyllosilicate subgroup, among which it belongs to the so-called clays. It is a aluminium magnesium silicate hydroxide, possibly with other elements.

**Handling bentonite slurry**
As the slurry picks up particles of materials in different sizes from the ground, some of its features need to be monitored while it is in use, such as density, viscosity and sand content; so that it can continue to do its job it must be kept “pure” in terms of its water medium. This means replacing dirty bentonite with new material several times during work.
Bentonite slurry can be dehydrated on site or by an outside waste management company. In both cases press filters are used for drying out and separating end product from water. The result of this separation is an end product made up on the one hand of dry bentonite with solids from the excavation and on the other of water with little or no contamination. The efficiency of the filtering process will depend on the right choice of filter cloth.

**Filter fabrics and their advantages**

The type of contaminating particles, in terms of their shape and size, will determine the choice of filter cloth to use. This may be polyamide or polypropylene in its multifilament, monofilament or mono-multifilament forms, with different permeability ratings. The result will be to attain the right level of moisture in the cakes so that they can then be sent to the waste disposal firm. One of the most widely-used grades in manufacturing press filter cloths for this type of use is polyamide 6. This type of fabric offers a high resistance to abrasion, which is a feature of bentonite slurry.

The cloth and the finish are of key importance to attaining the desired results.

**The advantages of the right finish**

To get maximum performance from the drying and separation process wrinkles must not be allowed to exist in the cloths. This is only possible with a philosophy of design and working which “dresses” press filter plates: a precise process for marking out the cloths, accuracy in cutting and exact placing of the side eyelets and holes at the top to secure the cloth perfectly over the plate.

The definitive enhancement comes from the application to the fabric of thermal or thermal-mechanical treatments such as heat setting or calendering, a finish which is applied as many times as is necessary and at different pressures to achieve greater or lesser permeability in the cloth. Depending on these variables, calendering makes it...
possible to seal monofilament fabrics up to 10 l/min/dm² at 20 m.m.c.a., with fabrics made with up to 105 threads per cm in the vertical filaments (the warp). These are very fine threads. The result is a high porous capacity (5,145 pores per cm²) which makes it possible to achieve a very high level of retention of small particles of product (fines).

The main attribute which calendering gives fabrics is an excellent, long-lasting ability to resist plugging.

The result of this filtering, a combination of fabric and finish, is greater purity of the water treated and maximum dryness of the resulting cakes.

**ECO²efficiency**

ICT FILTRACIÓN high-technology industrial filtration bags, fabrics and solutions are manufactured according to a concept which combines economic and ecological efficiency, and which we call ECO²efficiency. ICT FILTRACIÓN products assure excellent performance in economic terms thanks to a longer life cycle, 100% performance for longer, reduced demand for power in operation and elimination of wastage of end product in transit and containment processes. At the same time, they offer high efficiency from an environmental point of view: maximum control and minimisation of the risk of particle emissions into the atmosphere thanks to manufacturing and finishing processes which offer superior, extremely reliable results in terms of compliance with current legislation and safeguarding people and the environment.

**ABOUT ICT FILTRACIÓN**

ICT FILTRACIÓN, with its headquarters in Montgat, Barcelona, is one of Europe’s leading manufacturers of bags, cloths and solutions for industrial filtering of dust, air, liquids and fluids. ICT FILTRACIÓN designs, manufactures and markets high-quality products and services, both standard and customised, for applications involving a risk of emissions of particles into the atmosphere in industries such as aluminium, chemicals, pharmaceuticals, cement and food, among others. ICT FILTRACIÓN exports its products and services to countries in all five continents with the aim of helping companies to be more competitive and responsible by promoting, assuring and facilitating a balance between maximum industrial development and minimum environmental impact.

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