

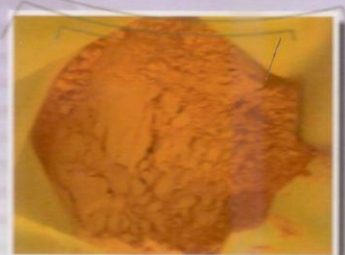


GEO DRY TECH

AGITATED NUTSCHE FILTER DRYER

**FILTRATION AND DRYING
EQUIPMENTS USED IN :**

- PHARMACEUTICAL
- CHEMICAL
- PESTICIDES
- MINERALS
- HERBAL
- DYES AND PIGMENTS
- AGRO CHEMICALS



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AGITATED NUTSCHE FILTER DRYER

The main function of agitated nutsche filtration and drying is to isolate solids in batch-oriented processing. There are various methods of recovering APIs from a slurry, but the most obvious advantage of nutsche filter dryers is the combination of slurry filtration, product washing, and vacuum drying processes into a single unit.

PROCESS OF ANFD:

• INITIATING FILTRATION

The agitated nutsche filtration process begins when the slurry is introduced to the vessel, either in bulk or in gradual volumes. Agitation generally doesn't begin until this initial step is complete. The agitator, which is a bladed drive assembly within the vessel, is then initiated. This begins a low-speed high torque mixing action close to the filter media to ensure the cake height doesn't inhibit the filtration rate. A gas pressure is subsequently applied and solid—liquid separation begins. As filtration advances, the agitator blades rise to the top of the product cake to smooth out cracks and/or preferential channels. This process is quicker than relying on gravity, and allows for faster filtration rates.



• SLURRY WASHING

Once the API crystals have been fully separated, any remaining filtrate and impurities must be washed-out. This can be carried out via a traditional or pre-slurry wash—the latter generally being preferred. A traditional wash introduces a solvent which seeps through the product cake to displace impurities or mother liquor residual traces. This is often conducted multiple times for best results.

A re-slurry wash may be conducted, which is a similar process albeit with the agitator ploughing the solvent into the cake before pressing. Solids are fully resuspended which increases the contact between solid surfaces and solvent, therefore reducing the total volume of solvent needed to reach equivalent purity levels. At the end of the process, persistent liquid is pressure filtered from the system.

• RESLURRY WASHING

As an additional washing option, a re-slurry washing can be performed if additional extraction or dissolving of impurities is necessary. This is executed by the addition of fresh wash liquid that is mixed with the solids. The agitator is stopped and raised before filtering the wash liquid. The re-slurry process is also used when a long contact time is needed between the wash fluid and the solids or the displacement wash does not provide the required wash quality.

• SMOOTHING

This next step may be used after any filtration or wash, especially after the final wash, when gas is blown through the cake. The agitator is used to close cracks and compress the cake to reduce residual moisture level. This function will help to



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achieve uniform flow of liquid or gas through the filter cake, while helping to eliminate liquid and gas channelling that reduces the efficiency of displacement washing and gas blow through.



• DRYING

After washing, the drying process can begin. Where it is necessary, there are two main options: pressurised gas heating, or vacuum-assisted heating. Both methods depend on optimal heat transfer within the vessel; so, heat transfer media is typically applied to the sidewall, filter base, and agitator blades. Additionally, the agitator continues to serve a critical purpose by providing gentle mixing and drying homogeneity.

The agitator ensures vertical homogeneity in the cake layer by raising/lowering as required. Even more difficult products can be broken down by temporarily reversing direction. This level of bespoke control extends to the temperature-controlled zones too. These can be cooled down at the end of the process to bring the product temperature down to a safe level for manual intervention during discharge.

This is a crucial step, and often the most difficult as the mixing action can be precisely and uniformly programmed throughout the process. Convective drying can dramatically accelerate process times, provided it is carried out effectively.

• DISCHARGE THE PRODUCT

Finally, the agitator again serves a critical role in product discharge, gradually forcing the cake to the vessel wall and discharge plug. A funnel is often used for optimised packing, and heel recovery can be performed using an additional product rake.

FEATURES OF ANFD :

Here are some other features of ANFDs:

• CLOSED SYSTEM

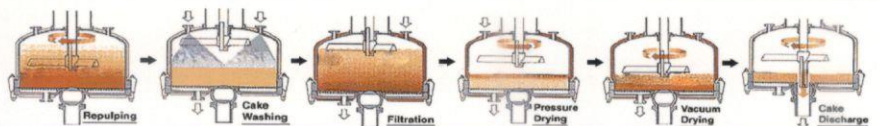
The closed design of the ANFD reduces the risk of contamination and cross-contamination

• EASY TO CLEAN AND MAINTAIN

ANFDs are easy to clean and maintain, which is important in industries where hygiene and safety are critical

• SMOOTHING AND COMPRESSION

The agitator lowers to the surface of the wet cake to smooth out cracks and compress the cake.



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TECHNICAL DATA SHEET FOR AGITATED NUTSCHE FILTER DRYER (ANFD)

MODEL NO.	GEO ANFD-100	GEO ANFD-200	GEO ANFD-500	GEO ANFD-1000	GEO ANFD-2000	GEO ANFD-3000	GEO ANFD-4000	GEO ANFD-5000	GEO ANFD-6000	GEO ANFD-8000	GEO ANFD-10000	GEO ANFD-15000	GEO ANFD-20000
WORKING CAPACITY	100	200	500	1000	2000	3000	4000	5000	6000	8000	10000	15000	20000
FILTRATION AREA (M ²)	0.2	0.28	0.78	1.1	2	3.1	4.1	5	6.1	8	10.1	12.5	16
AGITATOR RPM	10-12	10-12	10-12	8- 10	8- 10	8- 10	8- 10	8- 10	8- 10	8- 10	8- 10	8- 10	8- 10
MAIN MOTOR (H.P.)	2	3	5	5	7.5	10	12.5	15	15	20	25	30	40
HYDRAULIC POWERPACK MOTOR (H.P)	1	1	1	1	1	1	1	1	2	2	2	2	2
VERTICAL STROKE OF AGITATOR (MM)	200	250	300	300	300	300	350	350	400	400	400	450	450
CAKE CAPACITY (LITERS)	40	55	230	350	750	1160	1650	2000	2450	3100	4050	6250	8000
INTERNAL DIA(MM)	600	800	1000	1200	1600	2000	2200	2600	2800	3200	3600	4200	4500
OVERALL HEIGHT (MM)	2600	3000	3200	3600	4200	4400	4600	4700	4800	5000	5300	5800	6000
HEIGHT ABOVE PERFORATED PLATE (MM)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000

ANFD APPLICATIONS:

Agitated Nutsche Filter Dryers (ANFDs) are used in many industries for a variety of applications, including:

- **Pharmaceuticals :** ANFDs are used to maintain the quality and purity of drug formulations through precise filtration and drying.
- **Chemicals :** ANFDs are used to separate and purify chemical compounds for the production of industrial products.
- **Food processing :** ANFDs are used to filter and refine ingredients to improve product quality and safety.
- **Beverages :** ANFDs are used to clarify liquids and ensure the purity of drinks.
- **Petrochemicals :** ANFDs are used to separate and refine crude oil components for the production of fuels, plastics, and synthetic materials.
- **Bio-fuels :** ANFDs are used to filter and process raw materials into usable fuels. ANFDs are flexible and can perform a variety of tasks, including: ANFDs can handle hazardous products that are flammable, toxic, or corrosive. They can also be used to process heat-sensitive or temperature-sensitive materials.



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