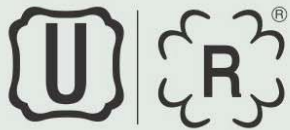


AGITATED PRESSURE NUTSCHE FILTER DRYER



ASME "U" & "R" STAMP
AUTHORIZED MANUFACTURER

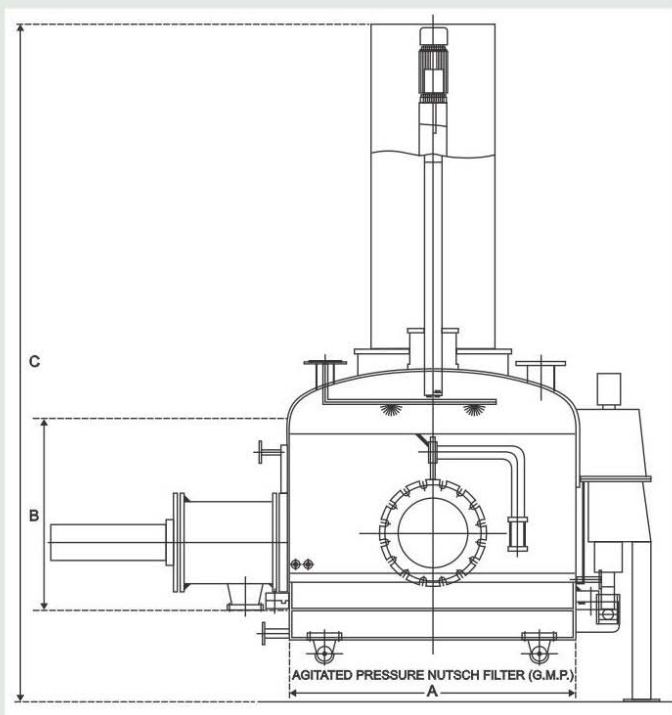


BEW Engineering Pvt. Ltd.

(A group company of Bifriends Engineering Works)

The Agitated Nutsche Filter Dryer

This is a combination of Filter and Dryer unit in single equipment to achieve economy in process and energy thereby improving profitability. This equipment can be used in manufacturing process of various Pharmaceutical and Food Products, Chemicals, Agro Chemicals, Pesticides, Insecticides, Dyes and Intermediates. It is also available for Sterile applications.



TECHNICAL DATA FOR AGITATED NUTSCHE FILTER DRYER (ANFD)

MODEL NO.	BEW ANFD-1	BEW ANFD-2	BEW ANFD-5	BEW ANFD-10	BEW ANFD-20	BEW ANFD-30	BEW ANFD-40	BEW ANFD-50	BEW ANFD-60	BEW ANFD-80	BEW ANFD-100	BEW ANFD-150	BEW ANFD-180
WORKING CAPACITY (LITS)	100	200	500	1000	2000	3000	4000	5000	6000	8000	10000	15000	19000
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	15.9
AGITATOR (R.P.M.)	12	12	10	10	8 TO 10	8 TO 10	8 TO 9	8 TO 9	6 TO 8	6 TO 8	6 TO 8	6 TO 8	6 TO 8
MAIN MOTOR (H.P.)	2	3	5	5	7.5	10	12.5	20	25	30	30	40	40
POWER PACK MOTOR (H.P.)	1	1	1	1	1	2	2	2	2	2	2	2	2
VERTICAL STROKE (MM)	200	200	300	300	300	300	350	350	400	400	400	500	500
CAKE CAPACITY (LITS)	40	55	230	330	600	940	1450	1700	2450	3200	4050	6250	7950
A (MM)	500	600	1000	1200	1600	2000	2300	2500	2800	3200	3600	4000	4500
B (MM)	600	700	800	1000	1000	1000	1000	1000	1000	1100	1200	1200	1200
C (MM)*	2600	3000	3300	3800	4200	4400	4600	4700	4800	5000	5300	5800	6000

* Above dimensions are indicative 'Height Reduction Flexibility' available in above

Note: Design and Dimensions above are subject to change without notice



BEW Engineering Pvt. Ltd.

(A group company of Bifriends Engineering Works)

The Equipment:

The Agitated Nutsche filter is a Nutsche type filter designed to separate solids from liquids under controlled conditions. It is totally enclosed and is normally operated under pressure or under vacuum. Additionally, the equipment is fitted with a stirrer mechanism which efficiently agitates the slurry during cake washing, smoothens and squeezes the cake during filtration and assists in the automatic discharge of the cake. The ANFD comprises of a pressure vessel in which a main shaft rotates and also moves in the vertical direction. Specially designed stirrer blades are mounted on the shaft, capable of performing various functions. A side discharge arrangement is provided, closing and opening through hydraulic / mechanical means. A filter plate is located at the base of the vessel in level with the discharge port to facilitate maximum cake removal. The filter medium, usually a filter cloth, is fitted on the filter plate which is replaceable type. A multilayered filter plate construction can also be provided for filtration instead of filter cloth. In addition a special design of interchangeable arrangement between filter cloth and multilayered sintered plate can be provided in the same equipment.

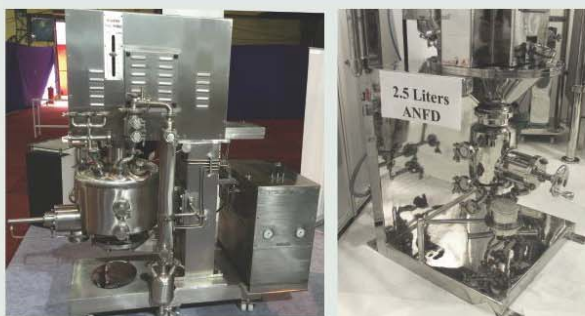
OPERATIONS :

CHARGING:

Slurry is charged into filter preferably by gravity flow from reactor installed above the filter or by slurry pump. Pressure balance line is kept open to avoid cloth ballooning.

FILTRATION:

While charging the slurry into the filter, filtrate will start passing through filter cloth by gravity. To enhance filtration rate and to keep filter media clean from initial sedimentation, the agitator can be brought down to its down most position and to be kept on rotating in forward direction. The cake height can be built up in successive steps.



NOTE: LAB SCALE MODELS ALSO AVAILABLE

PILOT PLANT AVAILABLE FOR TRIAL

CAKE WASHING:

Wash liquid is sprayed into the chamber on cake through a spray ring. The stirrer blades are lowered to agitate the slurry to obtain good cake washing. The wash liquid is sprayed repeatedly through the filter cake.

SMOOTHING AND COMPRESSION:

At the closing stage of the filtration process described above, the stirrer blades are lowered on the cake surface. The specially designed hydraulic system, takes over to perform a systematic, efficient and productive smoothing of the cracks which appear in the cake, leaving behind low residual moisture 10 to 20% less as compared to other conventional filters. This results in energy saving in drying process at least by 40%.

FILTER CAKE DRYING:

After the final wash, filtration and compression, the heating medium is fed into the limpet / jacket on shell and the chamber below filter plate as well as Hollow Shaft and Hollow Blades. The stirrer blades are lowered and the cake mass is agitated during the drying stage. The vapor is removed under vacuum applied to the filter through dust catcher. Drying can be enhanced by purging a hot gas through cake.

PRODUCT DISCHARGE:

The stirrer blades are rotated and lowered to cut away the upper surface off the filter cake. As the blades descend into the cake mass, the discharge valve is opened and a controlled discharge of the cake is achieved.



BEW Engineering Pvt. Ltd.

(A group company of Bifriends Engineering Works)

S

alient Features:

- Method of operation is totally enclosed. These conditions are excellent for contamination free operations maintaining purity and hygiene. Also solvent recovery, handling of toxic and hazardous materials without human intervention is easily achieved.
- Designed and Manufactured to suit critical hygienic conditions of pharma and food industries. (cGMP MODEL)
- Detachable bottom is operated by hydraulic cylinders and held tightly with zero leakage.



- Offered in a wide range of filtration area capacities upto 15.5 sq. mtrs. (4.5 mt. dia)

- The filtration process is very fast,
- Significant squeezing of filter cake is possible, thereby resulting in considerably lower residual moisture in the cake, resulting in reduction in energy requirement for drying of filter cake by upto 40% depending on cake characteristics.
- Enables easy, non-manual and automatic cake / solid discharge. Scraper blade can be provided to scrap the material which may stay on shell.
- The unit is designed with minimum maintenance features.
- Hollow Shaft and Hollow Blades for thorough drying.
- Specially designed tank cleaning CIP nozzles provided for thorough cleaning of inside of filter body.
- Metal to metal sealing discharge valve design available
- Special Online sampling valve available to take samples without stopping the equipment or releasing vacuum/pressure.
- Hinged type quick openable discharge valve cover provided.
- Has high batch handling capacities when compared with centrifuges & VTD's. This helps reduce batch to batch variations, product handling & contamination drastically.
- The equipment can perform as reactor-crystallizer, also in presence of catalysts.

User Friendly Machine

ENVIRONMENT PROTECTION

- No Toxic Emission.
- Solvent recovery to the maximum extent.
- Controlled quantity of wash water.
- Manual handling is almost nil.

SAVING

- Space Saving
- Energy Saving
- Labour Saving
- Product purity & Hygiene at its best.

MULTIFUNCTIONAL

- Filtration
- Washing
- Compacting / Dewatering
- Automatic discharge of wet cake
- Drying (On Request Only)

EASY FOR INSTALLATION

- Customers based nozzle orientation.
- Foundation not necessary.
- Easy installation & commissioning.

EASY FOR OPERATION

- Fully automatic operations can run the machine in complete auto mode.
- Single person can operate two/three nutsche filters.
- Semi-skilled person can operate the machine.
- All controls placed centralized.
- In built safety systems makes the machine safe.

EASY FOR MAINTENANCE

- Minimum maintenance required, due to the hydraulic system.
- Easy cleaning with hinged DV and detachable bottom.
- Detachable bottom version for toxic and frequent change of products.
- Quick changing filter cloth arrangement provided.



BEW Engineering Pvt. Ltd.

(A group company of Bifriends Engineering Works)

Design Data

DESIGN PRESSURE	: 5 Kg/Cm ²
JACKET OR LIMPET COIL	: 6 Kg /Cm ²
DESIGN TEMPERATURE	: 150°C
DESIGN CODES	: ASME, IS, DIN

MATERIAL OF CONSTRUCTION:



Stainless steel, Hastelloy C-276, Hastelloy C-22, Hastelloy C, Monel, Titanium, Mild steel, Rubber Lining, FRP Lining, FRV Lining, Tefzel, PFA, Halar Lining, Lead Lining etc.

SHAFTSEALS:

- 1) Wet & Dry Mechanical Seals with metallic below.
- 2) Packed gland type stuffing box with antifriction Bearing.

FILTER MEDIA:

- 1) Metallic Screens.
- 2) Multilayered Sintered wire mesh.
- 3) Filter cloth Natural or Synthetic fiber

CONTROLS:

- 1) A trouble free and easy maintenance Hydraulic system for up/down movement of shaft, bottom bed and open/close of discharge valve.
- 2) The discharge valve is specially designed for leak proof operation and automatic cake discharge.
- 3) Non-bolted quick detachable bottom designs facilitate easy cleaning, quick changing of filter media, recommended for various products processing. The bottom bed is trolley mounted for easy movement.
- 4) Limit Switches - to limit up and down movement of shaft, bottom bed and open/close of discharge valve.

- 5) Control Panel - Flame proof or as required. Complete PLC -HMI/SCADA based control panel can also be provided.



Variants

1. Isolater Compatible

ANFD's are available in variants compatible with barrier isolation systems at the discharge. This allows handling of Cytotoxic/ Potent products with operator safety. Additionally, these can be combined with automatic packing systems further downline. Also lab scale ANFD models are available for R&D purposes.



2. Sterile Construction

Sterile application ANFD models with completely automated SIP/CIP & operation cycles, sintered cartridge filter media, metal to metal sealing are also available.

3. Special Heel removal discharge valve

A specially designed quick openable discharge valve which allows much closer access to interior of machine for heel removal is also available



4. Special Quick detachable designs for bottom bed



a) Super 'C' Bayonet

This design is similar to a TC clamp design but hydraulic operated. This facilitates easy and fast bottom bed detachment for filter cloth & product change over. This design is good for vacuum and very low pressure applications.

b) Teethed Bayonet

This design has teethed body flanges, which are hydraulic operated and this is a 'Positive Locking' design. It facilitates easy and fast bottom bed detachment for filter cloth & product change over. This design is good for vacuum as well as high pressure applications.



5. Dual arrangement for filter media fixing.

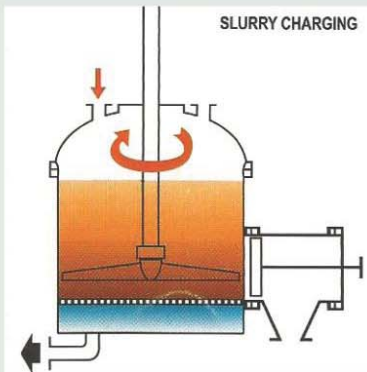
This is a special design to facilitate interchange-ability between filter cloth & multilayered sintered plate filter media's. This facilitates working with filter cloth in case of temporary down time with sintered media.



BEW Engineering Pvt. Ltd.

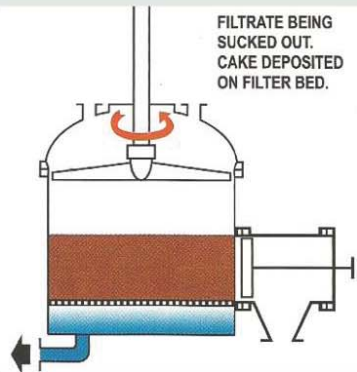
(A group company of Bifriends Engineering Works)

Sequence of Operation



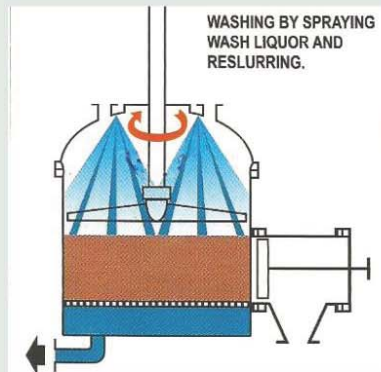
SLURRY CHARGING

Slurry is charged into filter preferably by gravity flow from reactor installed above the filter or by slurry pump. Vacuum is then applied in the filtrate receiver which is connected to the filtrate discharge nozzle.



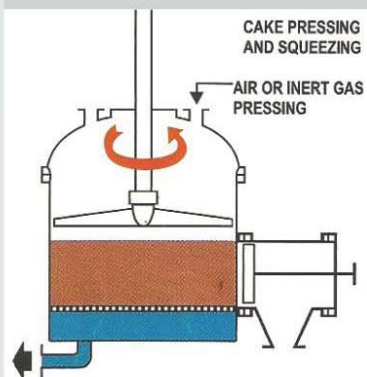
FILTRATE BEING SUCKED OUT. CAKE DEPOSITED ON FILTER BED.

Mother liquor is sucked through the filter bed and collected in the receiver, which is below the level of lower compartment of the filter, and slowly cake formation begins on the filter media. When most of the filtrate is sucked out, the cake is deposited on the filter bed.



WASHING BY SPRAYING WASH LIQUOR AND RESLURRING.

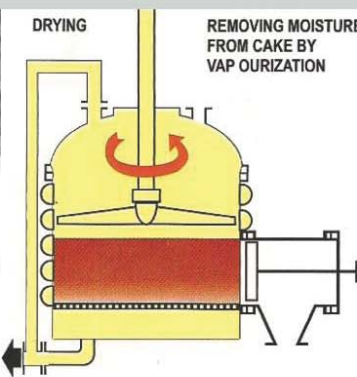
If necessary, after first filtration, wash liquor can be sprayed on filter bed and cake can be reslurried by manipulation of agitator movement. Filtration can be then repeated. As many washings as necessary can be done till cake is free from all impurities and the quality is within acceptable limits.



CAKE PRESSING AND SQUEEZING

AIR OR INERT GAS PRESSING

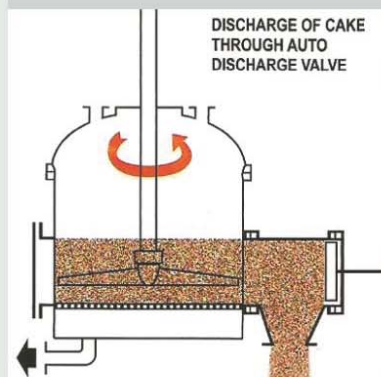
Further with manipulation of stirrer movement, cake can be pressed and squeezed and some quantity of filtrate can be removed thereby. Final moisture content may be between 5% to 25% depending on the characteristic of solids in the slurry.



DRYING

REMOVING MOISTURE FROM CAKE BY VAPORIZATION

Drying: Filter Unit can be provided with limpet coils or jacket for heating of the vessel. In this process vacuum is applied on the top of the vessel through dust filter as well as on bottom of the vessel, which will accelerate the drying process. The slow movement of agitator helps faster drying. Vapors will be generated inside the filter which can be extracted and solvent recovery can be done by installing vapor condenser and receiver.



DISCHARGE OF CAKE THROUGH AUTO DISCHARGE VALVE

Cake Discharge : Specially designed 'S' type agitator blade peels, cuts & scraps cake & pushes it towards the periphery and finally expels through discharge outlet plunger valve. (Not necessary to open manhole, DV located just in level with the filter plate.)

Manhole :
Helps to change filter media and access to internals for maintenance



BEW Engineering Pvt. Ltd.

(A group company of Bifriends Engineering Works)

Office & Factory : FE-10, MIDC, Phase-II, Manpada Road, Dombivli (East),

Dist. Thane - 421 204 Maharashtra (India) • Phone : 91-251-2873335/8

Website : www.filterdryer.com, www.bifriendsengg.com

E-mail: bifriends@bew.net.in