



**ENGINEERING  
SERVICES**

# ANFD solutions

**agitated nutsche  
filter dryers**



## **Design Features**

Single or 2-part dual construction  
Up to 12,000 Litre capacity  
10-200 Micron filtration  
Fully automated operation to cGAMP

## **Operational Benefits**

Enhanced operator safety  
Increased productivity & quality  
Compact, versatile & cost saving  
Maximum heel & solvent recovery

## Our ANFD Technology

S2 Engineering provide full turnkey solutions for Agitated Nutsche Filter Dryers (ANFD's) from design and manufacture to assembly, installation and commissioning. Our solutions provide equipment versatility and space saving benefits which reduce a plants capital and operating costs.

The S2 ANFD's are innovatively designed and engineered to help improve plant operational process efficiency. We are leading supplier of ANFD's in India with excellent in process media filtration and drying performance experience. Our aim is to provide high integrity, safe equipment to current good automated manufacturing practice (cGAMP) that meets all appropriate national and international industry regulations.

Our ANFD's feature a differential mixing agitator that moves vertically for thorough mixing. It has a series of sharp curved blades that achieve mixing penetration in difficult cakes without causing undue product stress. While moving and lifting the cake media around the vessel, agitation mixing efficiency is achieved through differential velocities.



A key benefit of the S2 design is that the dried/semi-dried cake can be washed after filtration by reslurrying the cake within an automated operational cycle for as many times as required. The cake is then discharged by lowering the agitator and rotating it in such a manner that it brings all the cake towards the discharge port. We provide integral barrier isolator (glove box) technology for contained discharge and charging operations of hazardous, potent and toxic products.

The S2 solution minimises any waste cake through innovative equipment design. The automated 'dual piece' ANFD model with detachable filter and bayonet or 'super clamp' design improves filter access, maintenance and cleaning in a highly efficient and labour saving manner. In summary, S2 has a wide range of innovative, modular, world-class ANFD solutions to suit all operational applications and budgets.

## Client Value-Adding Benefits

### Design Feature

1. cGMP & cGAMP equipment design and construction
2. Highly efficient drying with integrated heating system
3. PLC control based automation
4. Detachable bottom can be aligned to shell by 'Super Clamp' or Bayonet type design
5. Integrated Barrier Isolator discharge system for direct heel recovery system in a controlled operator safe environment

### Customer Benefit

- Thorough cake washing, high product purity and safe solvent recovery
- No manual handling between filtration and drying operations: safer solution
- Full operational versatility: ideal for multi-product, batch production plants
- Provides more reliable and safer clamping over conventional 'C' clamping
- Turnkey solution from single source supplier facilitates the smooth operation of all technologies in synergy which results in improved productivity & efficiency.



Turnkey Process Equipment Solutions and Services including:

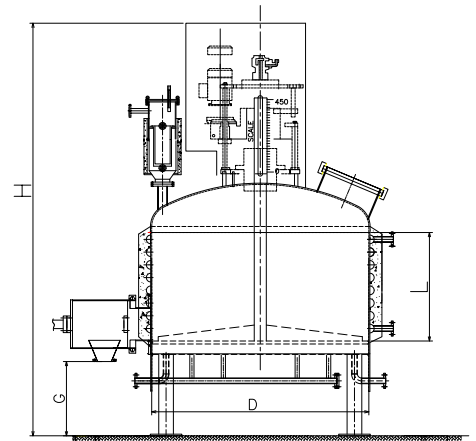
Design & Customisation | Ergonomic Trails & Operator Engagement | Manufacturing Assembly | Testing | FAT | Installation | Commissioning | SAT | Asset Healthcare

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## S2 ANFD Dimensional Data

| MODEL NO: | Filter Area Sq.M | Working Volume Lits. | Max.Cake Volume Lits. | Grass Volume Lits. | Diameter.D | Length.L | Discharge Clearance. G | Overall Height. H | Motor HP | RPM |
|-----------|------------------|----------------------|-----------------------|--------------------|------------|----------|------------------------|-------------------|----------|-----|
| S2F-P1    | 0.02             | 5                    | 2                     | 6                  | 150        | 250      | 600                    | 1250              | 0.5      | 30  |
| S2F-P2    | 0.08             | 50                   | 22                    | 61                 | 330        | 650      | 900                    | 2100              | 0.5      | 10  |
| S2F-P3    | 0.16             | 80                   | 35                    | 87                 | 450        | 500      | 500                    | 2300              | 1        | 14  |
| S2F-P4    | 0.24             | 150                  | 48                    | 168                | 550        | 650      | 500                    | 2400              | 1        | 14  |
| S2F-P5    | 0.28             | 200                  | 70                    | 233                | 600        | 750      | 500                    | 2500              | 2        | 14  |
| S2F-P6    | 0.50             | 300                  | 100                   | 352                | 800        | 600      | 500                    | 3000              | 3        | 12  |
| S2F-P7    | 0.78             | 500                  | 235                   | 647                | 1000       | 700      | 750                    | 3300              | 5        | 12  |
| S2F-P8    | 0.94             | 750                  | 332                   | 892                | 1100       | 800      | 750                    | 3675              | 5        | 12  |
| S2F- 1    | 1.13             | 1000                 | 504                   | 1021               | 1200       | 1000     | 750                    | 3800              | 7.5      | 12  |
| S2F- 1.5  | 1.76             | 1500                 | 706                   | 1836               | 1500       | 1000     | 900                    | 4250              | 10       | 12  |
| S2F- 2    | 2.00             | 2000                 | 803                   | 2462               | 1600       | 1000     | 900                    | 4000              | 10       | 14  |
| S2F- 2.5  | 2.50             | 2500                 | 1017                  | 3151               | 1800       | 1000     | 900                    | 4400              | 10       | 12  |
| S2F- 3    | 3.10             | 3000                 | 1256                  | 3933               | 2000       | 1000     | 900                    | 4500              | 12.5     | 10  |
| S2F- 4    | 4.15             | 4000                 | 1661                  | 5407               | 2300       | 1000     | 900                    | 4700              | 12.5     | 10  |
| S2F- 5    | 4.90             | 5000                 | 1962                  | 6701               | 2500       | 1000     | 550                    | 4500              | 15/20    | 10  |
| S2F- 6    | 5.70             | 6000                 | 2575                  | 7822               | 2700       | 1000     | 500                    | 4600              | 20       | 10  |
| S2F- 8    | 8.00             | 8000                 | 3617                  | 11500              | 3200       | 1000     | 500                    | 4650              | 25       | 10  |
| S2F- 10   | 10.70            | 10000                | 5373                  | 16046              | 3700       | 1000     | 500                    | 4850              | 25       | 10  |
| S2F- 12   | 12.56            | 12000                | 6280                  | 18909              | 4000       | 1000     | 900                    | 4925              | 30       | 10  |



All sizes in (mm). We reserve the right to change the specifications at any time. If in Doubt, please ask.

## S2 ANFD Technical Data

- **Design:** ASME Sec.VIII, Division-I, Latest Edition.
- **Construction:** cGMP & cGAMP
- **Main Dimensions:** See size chart above. Bespoke designs are made to suit specific client applications
- **Flange Drilling:** ANSI - B 16.6, #150
- **Capacity:** Typically supplied from 2L (for Kilo labs) to 12,000L (for bulk production), although larger models can be designed to suit client requirements.
- **Operating Pressure:** 0-6 barg (0-90 psig)
- **Operating Temperature:** up to 200 Deg C (390 Deg F)
- **Filtration:** 10-200 Micron
- **Standard Configuration:** CE Type, Single Piece Monoblock design with monolithic bottom
- **Material of Construction:** 316L Stainless Steel is the default supply standard. Optional materials include SS 316 Ti, SS 904L, Duplex, Titanium and Alloy C22.

High chemical resistant coatings can be applied on the wetted components of the S2 ANFD. Options include Glass Lining (Enamel) and Stancoat. Please see our website for full details.



# S2 ANFD Supply Options

S2's ANFD range is designed around a modular concept therefore can be easily customised to suit specific client application requirements. Some of the more standardised supply options are listed below;

## Top Design

- CE Type - one piece lid / body (Standard Supply)
- AE Type - removable lid for cleaning / access

## Vessel Design

- Single Piece – Monoblock design with monolithic bottom
- Dual Piece – Detachable bottom type (portable on wheels)

## Detachable Bottom Design

- Bayonet design - Machined castellations (shell - bottom)
- 'Super Clamp' design - Sprung lock strap (shell - bottom)
- Manual clamping (Standard supply on Dual Piece)
- Automated hydraulic clamping

## Instrumentation & Electrics

- Full instrumentation pack for control room operation
- Load cells for in-cycle material weighing before discharge of product
- Variable speed drive electric motor for reduced equipment energy consumption and "ramp-in / gentle" mix startup

## Supporting Systems

- Standalone Thermal Control Unit (TCU) to manage and supply the thermal heating and cooling fluid for the heating jacket (where plant services is not available)
- Operator gantry and staircase
- Material loading / charging system (Material Handling)
- Standalone Hot Water Washing Systems - CIP, SIP, WIP
- Controlled / automatic discharge system.

## Safety & Regulatory Compliance

- ATEX rated (explosion proof) electrics to any standard
- Bespoke guarding systems & laser beam guarding
- Integral Discharge Barrier Isolator - External access
- Integral Discharge Barrier Isolator - 1/2 Suit Internal access
- Integral Charge Barrier Isolator - External access
- Integral Charge Barrier Isolator - 1/2 Suit Internal access
- CE and PED compliance (for European shipments)

For bespoke ANFD supply configuration, please contact our technical sales support team.



Above: CE lid design with Dual Piece vessel-bottom (detachable on wheels)



Above: Single Fluid Heating & Cooling System to accurately manage the temperature of the ANFD jacket.



Above: CE lid design with Single Piece vessel-bottom supply option



Left: ANFD with Integral Barrier Isolator (Glove box)



Above: Operator 1/2 Suit Barrier Isolator (internal working)