SUPERIOR
FILTRATION

PRODUCT SHEET

AGF AUTONOMOUS GRAVITY SAND FILTER

Our AGF Autonomous Gravity Sand Filter is a mechanical rapid gravity sand filter. It is a polishing filter used for the removal of fine suspended solids from water. It requires no external control system or electrical supply. The backwash cycle initiation occurs autonomously and is driven entirely by built-in hydraulic design features. Operator intervention is limited to periodic maintenance inspections.

Applications

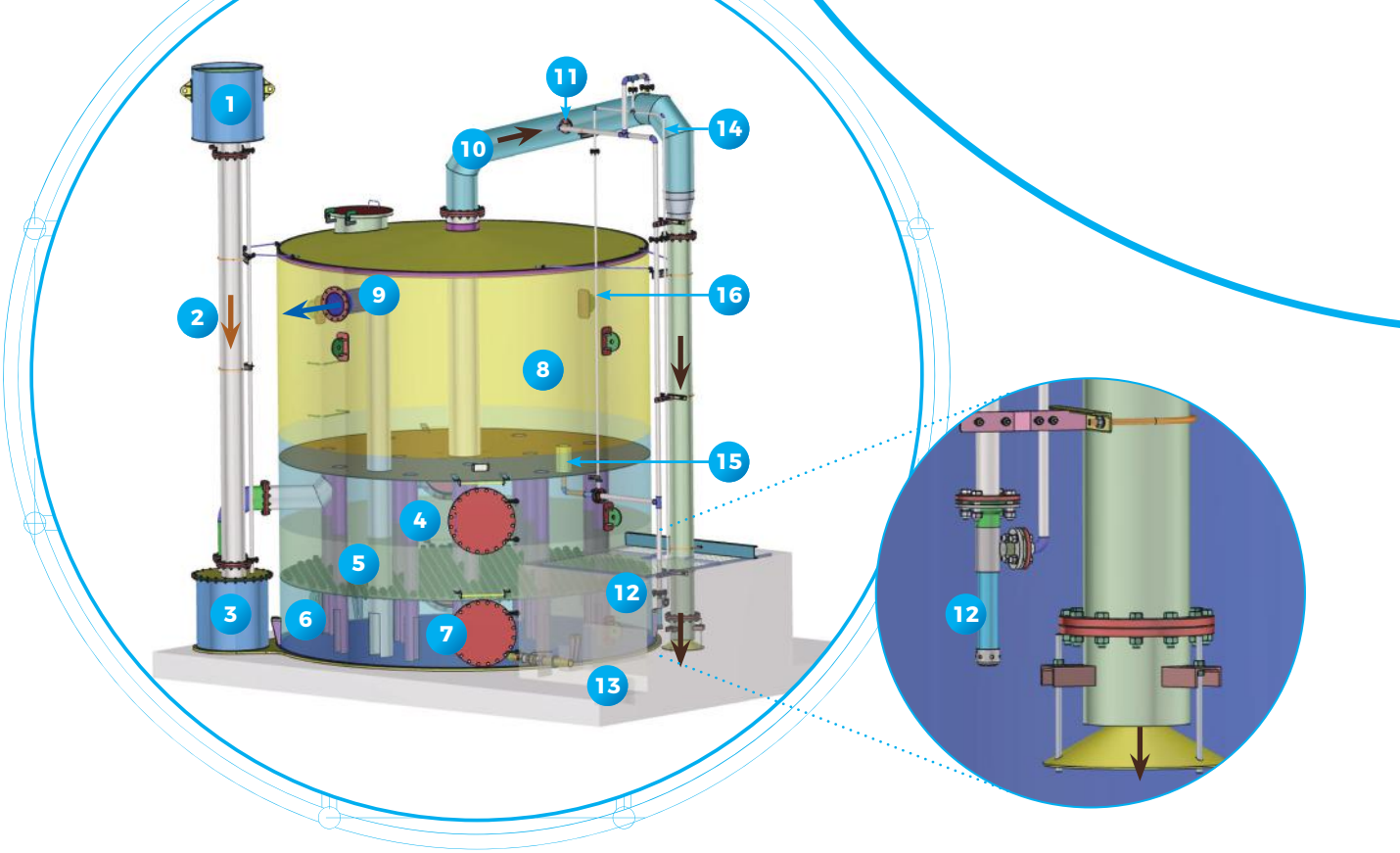
The AGF is commonly installed as polishing filters to remove unsettled flocculant and other suspended solids. Its applications include the following:

1. Polishing filter on potable water treatment plants where mixing, flocculation and sedimentation stages typically precede the AGF installation
2. Removal of precipitate in iron and manganese removal processes.
3. Side-stream filters on cooling systems

Industries

AGFs are used extensively in industries where polishing of process water is required. These include:

- **Industrial Process Water**
  - Agricultural and Horticultural
  - Automotive
  - Brewing & Distilling
  - Food & Agri Processing
  - Nuclear
  - Pulp & Paper
  - Power Generation
  - Quarrying
  - Rubber Processing
  - Textiles
- **Mining**
- **Mineral Processing**
  - Steel Processing
- **Potable Water and Sewage Wastewater**
- **Petrochemicals**
  - Refining
  - Pharmaceutical
  - Plastics
- **Oil and Gas**



How it Works

The AGF is designed to operate autonomously for extended periods of time, minimizing maintenance and operational costs. The AGF's only requirement is that the water supply:

- must be regulated so as not to exceed the prescribed flow rate
- must be supplied at the prescribed head

The head can be achieved through gravity or low-lift pumps. Once the above two requirements are met no further energy input, control or interventions are required.

Dirty water is supplied to the header tank 1 by gravity feed or by low-lift pumps. The water then flows down the feed pipe 2 and via the loop tank 3 into the central filtration compartment 4, where it is introduced above the media bed 5.

The loop tank serves to vent air and to deflect the force of the water. The water flows under gravity through the media bed and through the nozzles to the bottom filtrate collector compartment 6. Suspended solids are retained in the media bed.

The filtrate then flows upwards through a series of riser pipes 7 transferring it to the top filtrate storage compartment 8. When the filtrate storage compartment is full, flow to service commences 9. Accumulation of dirt in the media bed cause a gradual drop in the filter head which causes a rise in the level of the water in the backwash pipe 10 and the feed pipe 2.

Water continues to rise in the backwash pipe until it reaches the geometrically built-in maximum level 11, from where it is diverted to the venturi feed line. As the water passes the venturi 12, air is evacuated from the backwash pipe via the suction line 14 and vented into the backwash sump 13. A siphon is established that initiates backwash.

The backwash pipe 10 is designed large enough so that the water demand driven by the siphon is several times higher than the feed supplied to the filter. This immediately reduces the static pressure above the media bed in the central filtration compartment 4 to below the pressure in the filtrate storage compartment 8.

In the resultant reversal of flow, water from the filtrate storage compartment 8 is drawn down the riser pipes 7 and back up through the nozzles in the central filtration compartment 4. The media bed is expanded and thoroughly agitated. Loosened dirt is carried away via the backwash pipe 10 and discharged into the backwash sump 13.

Backwash continues until the water level in the filtrate storage compartment 8 clears the orifice of the siphon breaker pod 15. Air is introduced to the backwash pipe 10 via the siphon breaker line 16. This terminates the siphon.

The filter then reverts to filtering mode. The first filtrate (rinse water) refills the filtrate storage compartment before flow to service is restored 9. This cycle continues without the need for external controls or human intervention.

Alice Potable Water Treatment Plant – Eastern Cape, South Africa

Amathole District Municipality operates a 7MLD potable water treatment plant at Alice, a rural town in the Eastern Cape province in South Africa. In 2003, during the design phase, process engineers were looking for highly efficient polishing filters that would ensure compliance with **potable water** standards for Turbidity and TSS.

In addition, they required:

- zero electrical energy consumption
- high reliability
- low maintenance costs
- easy maintenance functions

They selected 3 x **AGF42S** (97m³/h per unit @ 7m/h) **autonomous, mechanical rapid gravity sand filters.** Since commissioning in 2004 the AGF filters have consistently produced high quality filtrate and fulfilled the requirements that the process / design engineers set.

Air Products SA (Coega) – Eastern Cape, South Africa

Air Products South Africa manufactures industrial and specialty gas products. Large, industrial **cooling water** units form part of their manufacturing plant. Atmospheric pollutants and other suspended solids contaminate the cooling water leading to substantial losses in efficiency.

Overcoming the inefficiencies requires increased energy inputs and chemicals consumption. Removal of the suspended solids with a **side stream filter** brings immediate and lasting economic benefits (reduction in energy consumption and chemicals usage).

Air Products SA uses **AGF Autonomous Gravity Sand Filters** on three of their production plants. At Coega they installed an **AGF21S** (35m³/h @ 10m/h) sand filter. Since commissioning in 2014 the AGF filter has consistently produced high quality filtrate, delivering economic benefits to the plant. Maintenance and operating costs have been kept at absolute minimum levels.

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