

FLOCCULANT MIXING SYSTEMS



TRANSMIN

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Flocculant preparation has been a mainstay of Transmin's business and extends to multiple reagent systems including guar, starch, depressant, coagulant and frother preparation systems. Transmin has experience in the preparation of liquid solutions for reagents such as soda ash, magnesia, ammonium sulphate, fluorosilicate, xanthate, PAC and other liquids.

Transmin's bulk material handling expertise and the technical knowledge of some of the world's largest manufacturers of polyacrylamide flocculants, has resulted in the development of a range of fully automated Polymix flocculant preparation systems.

Each system has identical standardised control and mechanical design philosophies with changes in tank and equipment sizes and capacities. This high degree of standardisation reduces delivery lead times and allows for optimised spares inventory support.

Utilising this knowledge gained on Polymix systems, Transmin has expanded its range from 4kg/h throughput all the way upto 472kg/h throughput. These high capacity systems are used for the treatment of large volumes of tailings generated by mines.

The high throughput systems can utilise large capacity storage silos filled by bulk tanker truck delivery. Capacities for silos are often chosen for 7 or 14 days worth of dry polymer storage.

Further to dry storage, storage of the mixed polymer solution is done in large capacity tanks, usually sized with 6 to 12 hours of storage capacity.

Other storage durations can easily be accommodated, depending on customer preference.





Benefits

The benefits of using flocculant processing plants:

- ▶ Simple modular construction and efficient design ensures easy maintenance, fault finding, parts replacement and reliable operation.
- ▶ Heated Cone within dry feed system ensures flocculant powder is suitably dry to ensure efficient pneumatic conveying to wetting head.
- ▶ Automated control with minimal operational involvement other than loading bulk or single bags into the storage hopper at pre-set frequencies. Larger systems use tanker truck fed silos.
- ▶ Remote monitoring of system is easily connected.
- ▶ Safe and easy hopper loading bag breaker with bag loading bay and access ladder to the hopper inlet.
- ▶ Sensible layout and design results in minimal splashing of flocculant solution, with platform layouts enabling an easy and safe wash down for tank surfaces. Efficient spatial design of system ensures minimal plant footprint.
- ▶ All mechanical equipment is sufficiently rated for external operation, and is sufficiently shrouded from wash down.
- ▶ Optional flocculant dosing pumps and control packages with dry run protection if required.
- ▶ Polymix control panel positioned on the flocculant access platform as an integral part of the modularised package, providing easy access and observation of system control.
- ▶ Simple external operator adjustments for required process control exist on the main control panel as well as a fail-safe emergency stop facility.
- ▶ Blower ducting is joined by simple couplings for flexibility of installation and easy pipe removal for maintenance and cleaning.





VOLUMES			
MODEL	FLOCCULANT THROUGHPUT (kg/h)	MIX TANK (m ³)	STORAGE TANK (m ³)
Polymix 1000	4	1	2
Polymix 2000	7	2	4
Polymix 4000	11.5	4	8
Polymix 5000	18	5	18

**Larger sizes/duties are available upon request.*



Case Study:

LARGE SCALE FLOCCULANT MIXING AND DOSING PLANT FOR HEAVY MINERAL SANDS TAILINGS TREATMENT



Location:

Cataby, approximately 150km north of Perth, Western Australia

Operation Type:

Heavy Mineral Sands Tailings

Equipment Solution:

Flocculant Plant (472kg/h dry feed rate)

Year:

2019



Scope of Project:

Due to Transmin's knowledge of large scale flocculant preparation plants, we were approached to design, engineer and fabricate a flocculant storage, mixing and dosing plant for one of the newest Heavy Minerals Sands mining and processing plants in Western Australia.

The client requested that Transmin would supply the whole flocculant plant.

The Solution:

Fabricated at Transmin's workshop in Malaga, it took 20 weeks for the Transmin team to build and factory test the equipment before it was shipped to the mine site north of Perth, Western Australia

The dry flocculant polymer is delivered via bulk tanker trucks, where it is pneumatically blown into the 170m³ geometric capacity storage silo via the off-loading compressor on-board the delivery truck.

Due to the large required throughput of the system (472kg/h dry feed), Transmin designed the system with dual dry feed systems, dual wetting heads and dual mix tanks.

The dry feed systems take discharge directly from the silo via screw feeders into heated cones (to remove moisture) prior to being pneumatically conveyed to the wetting heads via the blower and eductor/venturi assembly.

The wetting head assembly is designed with a centrally-located dry feed discharge encircled by the

wetting nozzles to ensure the best possible dissolution of the polymer can occur in the mix tanks. Due to the volume of water required the wetting head assembly includes a rapid fill nozzle as well as a water inlet manifold, complete with instrumentation and valving to ensure flow and pressure are maintained.

The dual mix tanks are 150m³ capacity each. The solution is continuously and gently agitated for a minimum of 30 minutes to suitably age the flocculant solution and allow the polymer chains to "uncoil".

After each batch of mixed flocculant solution is completed, it is transferred via low-shear, progressive-cavity pumps to the storage tank. The capacity of the the storage tank is 660m³, which equates to approximately 7 hours of flocculant solution storage. Due to the size of the storage tank it was fabricated in strakes to facilitate ease of transport to site. The tank was then assembled on-site by welding the strakes together and painted in-situ.

The flocculant is then dosed into two separate downstream unit processes via progressive-cavity pumps and static mixers. The static mixers are designed to further dilute the mixed flocculant solution to ensure the correct flocculation of the solids within the processes.

A control system that interfaced with in-field instrumentation was supplied to ensure that the batching process could be completely automated.



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