

Ixom Port Kembla Manufacturing

Ixom Port Kembla operates three main manufacturing plants.

- Spent Acid Regeneration Plant (SARP)
- Sodium Bisulphite Solution (SBS) Manufacture
- Dilute Sulphuric Acid

Spent Acid Regeneration Plant (SARP)

The SARP is a purpose sized and designed acid plant to enable environmentally sound regeneration of waste sulphuric acid from the oil refining process in eastern Australia. It is the only plant of its kind in operation in Australia.

Spent Acid Regeneration Plant Process

1. Spent alkylation acid is transported to Ixom Port Kembla by dedicated road bulk tankers designed to carry this material. The transport is managed by Ixom from start to finish and is monitored and tracked by the Victorian and NSW environment protection authorities throughout the process
2. Once received on site at Port Kembla the acid is unloaded through specialty acid handling equipment into dedicated waste acid storage tanks ready for processing through the SARP
3. At the SARP, the spent acid is incinerated at high temperature to break it back down to sulphur dioxide (SO_2) which can be converted back into clean acid
4. After incineration, the gas, containing SO_2 , is passed through several gas cleaning and cooling vessels and finally a gas drying section
5. Once clean and dry the SO_2 is then ready for conversion into first, sulphur trioxide (SO_3), and finally clean, concentrated sulphuric acid
6. Conversion of SO_2 to SO_3 takes place in a vessel called the converter which is a tower containing a specialised catalyst material for this purpose. As soon as the converter reaches operating temperature, the conversion reaction generates enough heat to keep itself running - the process at this point is described as being auto-thermal
7. After conversion to SO_3 the gas stream is passed through two absorbing towers where it is absorbed in a recirculating stream of concentrated sulphuric acid. Water is added to maintain the concentration at the desired 98.5% purity and more acid is generated
8. The exhaust gas from the process is discharged via the SARP stack.
9. The manufactured (product) acid is cooled and transferred to fresh acid storage tanks ready for return to the refineries.

The entire process operates continuously, 24 hours per day, 365 days per year, and is only stopped for planned maintenance events once or twice per year or in events such as power outages or other unplanned events in which case the plant 'trips' offline to a safe condition. Such trip events automatically activate the plant's emergency trip system to protect people, the environment and the plant itself.

Sodium Bisulphite Solution (SBS) Manufacture

The SBS plant operates as a 'batch' process and is run to produce product 31% sodium bisulphite solution for customers such as the water treatment industry.

Sodium Bisulphite Solution Manufacture Process

1. In addition to spent sulphuric acid, waste molten sulphur from the oil refining process is also treated in the front end (incineration, gas cooling and cleaning) of the SARP. Burning this waste sulphur generates additional SO₂ which can be converted to acid via the SARP process and/or used to make SBS
2. After the incineration, gas cooling and cleaning process (SARP front end) part of the SO₂ generated is sucked across to the SBS plant using a specialised fan called the SBS plant blower
3. The blower directs the SO₂ containing gas into a mixing vessel called the reactor which has been pre-dosed with a mixture of water and dense soda ash (DSA) - also known as sodium carbonate which is similar to bicarb soda you may use in your kitchen at home
4. The SO₂ and DSA solution react over a period of many hours to produce a batch of sodium metabisulphite in water, called sodium bisulphite solution
5. Once the reaction is complete the reactor contents are pumped into a conditioning tank where the purity of the solution is tested and extra water is added (if required) to meet the required product purity.
6. The product is then pumped into a holding tank ready for despatch to customers.
7. Similarly to the SARP, the SBS plant also discharges exhaust gas from the process via the SMBS plant stack.
8. Dilute Sulphuric Acid

The third manufacturing process operated onsite is a small sulphuric acid dilution plant (ADP). Similar to SBS manufacture this plant operates as a batch process to produce one main dilute acid grade to order.

Dilute Sulphuric Acid Manufacture Process

1. Fresh 98.5% sulphuric acid produced in the SARP is periodically redirected from the sites main acid storage tanks to the small 98.5% storage tank in the ADP via dedicated and purpose built transfer pipeline
2. Plant operators determine when a new batch of dilute acid (70% acid is the primary grade produced) is required and start the system up to produce it
3. The computer control system in the plant then determines the ratio of water and acid to mix to produce the desired product acid concentration
4. The acid and water are then mixed through a special mixing system which is cooled by cooling water circulating through a small cooling tower
5. The cooled product acid is then stored in a specially designed fibreglass storage tank ready for despatch to customers as required.