

# Premium Sand Manufacturing Technology





Kayasand designs and builds processing facilities for precision separation, shaping and grading of sand, fine aggregates and recycled materials.

At the heart of Kayasand plants is a specialist V7 crusher and RCAS air screen technologies developed by KEMCO in Japan.



New Zealand has a history of leading the way in developing world leading technologies to replace natural sand in concrete production. In the 1970s the Barmac crusher was invented in New Zealand and became commonplace in quarries around the world. Barmac's improved aggregate shaping capability enabled manufactured sand to replace up to half the natural sand used in concrete.

Kayasand's founder, Andi Lusty, was Managing Director of the company and supplied Barmac crushers globally for 30 years. In the early 2000s he encountered the revolutionary new Kemco V7 crushing technology developed by their chief engineer, Dr Kaya. This new technology enables manufactured sand to replace all the natural sand in concrete.

Kemco launched the technology in the year 2000 as Japanese municipalities banned all non-essential dredging after overwhelming concerns about environmental damage.

The technology was a huge success, with about 60 V7 plants now operating in Japan and over 100 in China. Concrete is now routinely made with V7 sand replacing all the natural sand. As a result dredged sand use in Japan has dropped from 40 million cubic meters in 2000 to less than 7 million cubic meters today.

Kayasand is bringing this innovative technology to New Zealand, Australia and the Pacific Islands. Our vision is for widespread production of quality concrete using only sustainably sourced manufactured sand.

Kayasand's hi-tech, unmanned plants are designed to be reliable and cheap to run. Precision real-time control and advanced remote monitoring capabilities mean the plant operates for long hours, maximising capital utilisation.





# A new standard in manufactured sand

Kayasand plants use Kemco's proprietary V7 sand making system developed in Japan and used extensively across Asia.

Kemco's proprietary crusher and air screen technologies outperform all other technologies for fine aggregate manufacturing and screening.

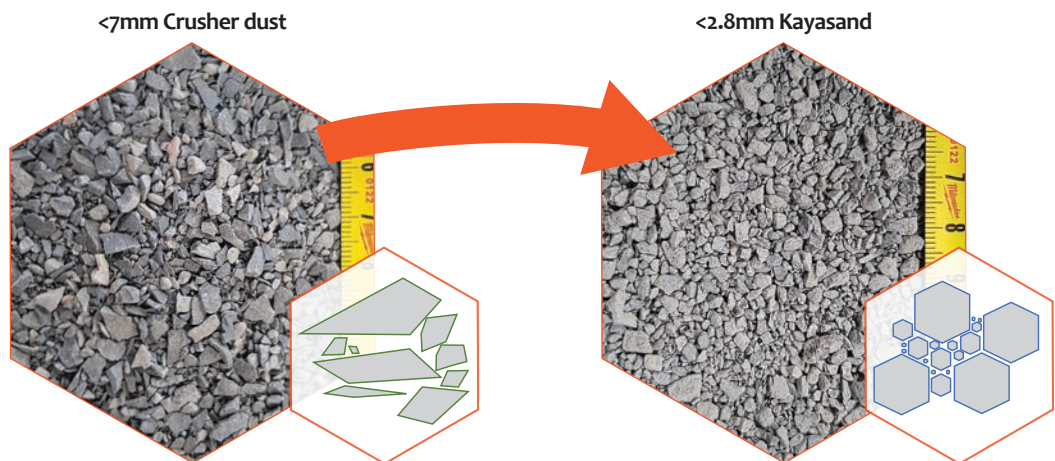
Our technologies enable premium quality fine aggregate to be manufactured at low cost with low environmental impact.

- ◆ Precision gradation
- ◆ Excellent shaping
- ◆ Consistent quality
- ◆ Contamination removal
- ◆ No wash plant

## The future of concrete sand production

Traditional sand supply changes are becoming increasingly unsustainable economically and environmentally. As a result, demand for manufactured sand is growing.

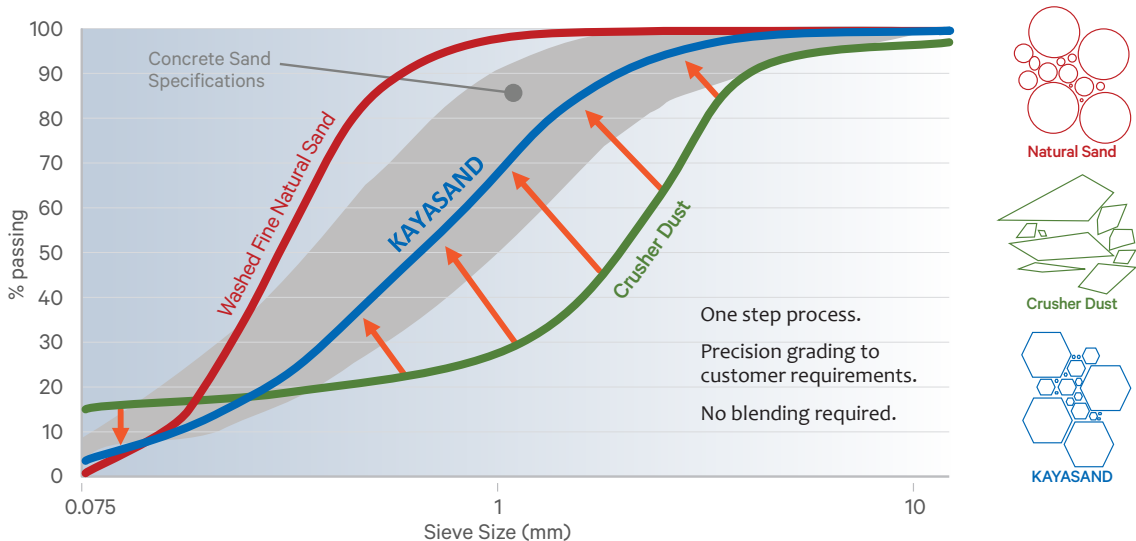
So too is demand for effective utilisation of waste products such as recycled glass, concrete and slag. Kayasand plants process crusher dust and recycled materials into premium sand for concrete and asphalt.



Poorly shaped crusher dust means concrete requires more cement, lower workability and poor finish.

Cuboidal shaped Kayasand means better packing, workability, finish and lower cement requirements.

### A one step process for converting low value crusher dust into high value concrete sand



Dust collector removes fine deleterious material smaller than 75µm without washing.

The unique Kemco crusher design generates fines in the 0.1-1mm size range.

# V7 Premium Sand Manufacturing

Concrete production has historically required natural sand. But the cost and environmental impact of natural sand makes it increasingly unsustainable.

Viable natural sand resources in many areas across the world are becoming depleted or harder to access. The combination of extraction costs, transportation costs, environmental damage from digging and access to water for washing mean the industry must find viable alternatives.

Traditional manufactured sand is a sustainable alternative, but:

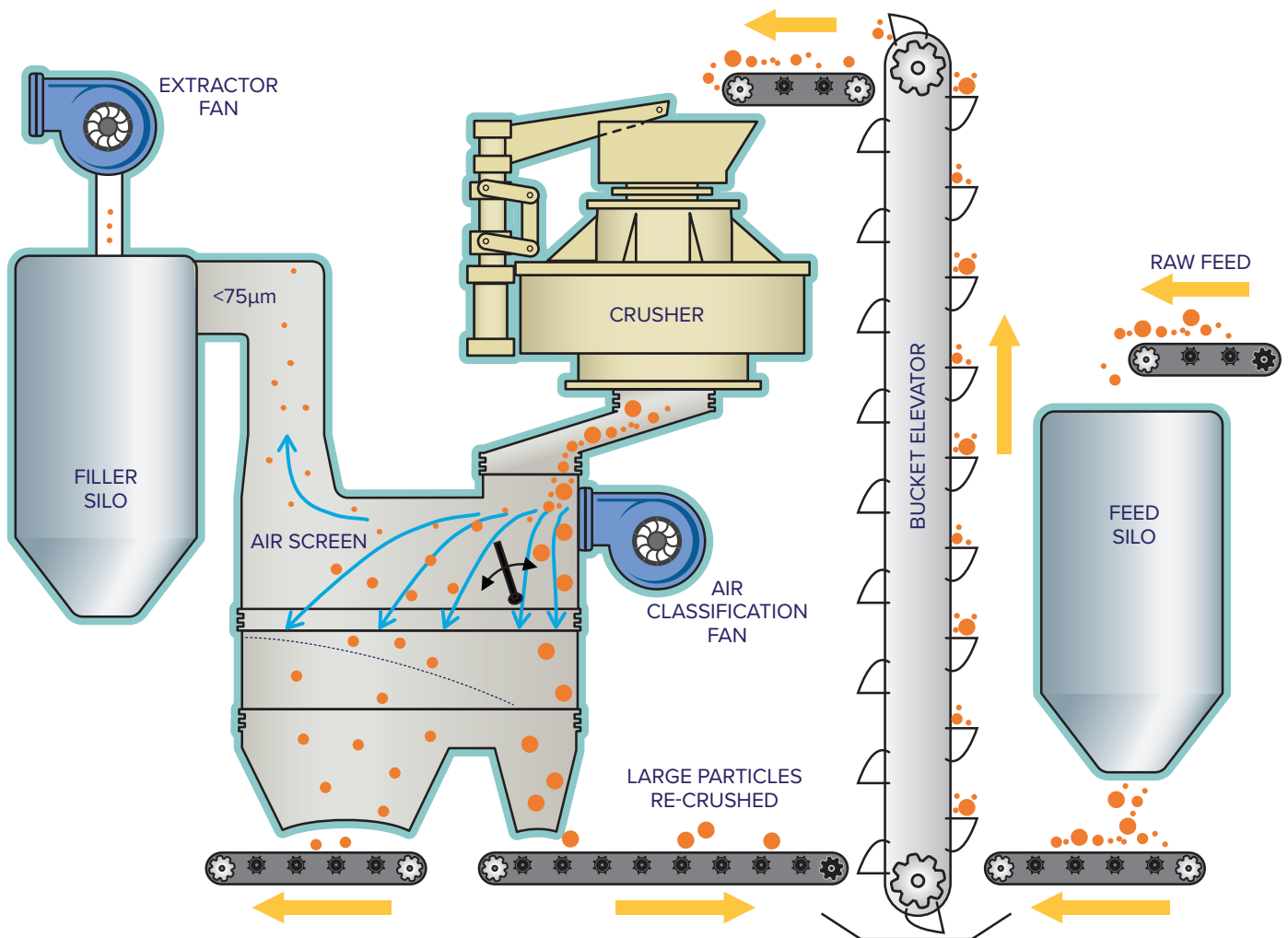
- Low quality shape and grading means it must be blended with natural sand to improve performance.
- Removing deleterious materials requires washing, which is expensive and wasteful.

The result? Manufactured sand typically replaced 20-55% of natural sand in good quality concrete.

Kayasand's unique one-step process to crush and screen surplus crusher dust into premium concrete sand is the answer for quarries and concrete plants.

## World leading crushing & air screening

Kayasand's unique crushing system uses autogenous crushing in the particle cloud and on the rock bed. A unique secondary impact zone enables excellent shaping above and below 1mm.



Excellent shape – stronger concrete



Precision grading – better workability



Consistent quality – consistent concrete



Reduced natural sand dependence

# CASE STUDY — Holcim Albion Park Quarry in New South Wales

## BEFORE

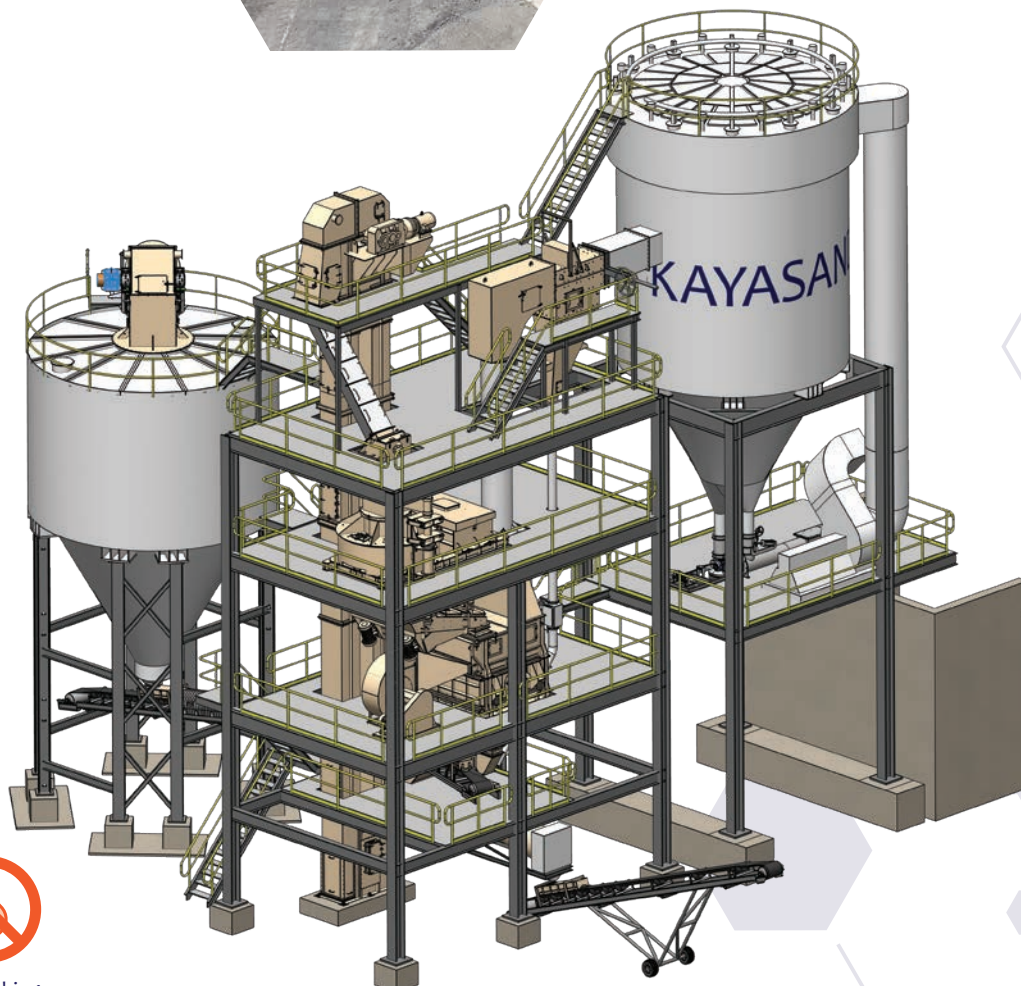
- Natural sand around Sydney is either poor quality or in limited supply.
- Crusher dust from Albion Park used to replace only a small proportion of natural sand in concrete.
- Excess crusher dust produced at the quarry meant their stockpile was growing by 100,000 tonnes per annum.

## AFTER

- Over **110,000** tonnes of Kayasand produced in 2020.
- **6** concrete plants across the Illawarra use Kayasand.
- Quarry's crusher dust stockpiles are dramatically reducing.
- Holcim receives Environmental Innovation Award from Cement, Concrete and Aggregates Australia (CCAA).

## SPECIFICATIONS:

- Infeed: 0-7mm crusher dust.
- Technology: Kemco US7 Crusher, Kemco VF2500 diffusion feeder, Kemco AS2500 air screen, bucket elevator, dust collector, sand conditioner, conveyor systems and Kemco PLC and Kayasand plant monitoring systems.
- Output: 0-5mm Kayasand™ premium concrete sand.



Cement savings



No washing required



# V'sepa Precision Screening

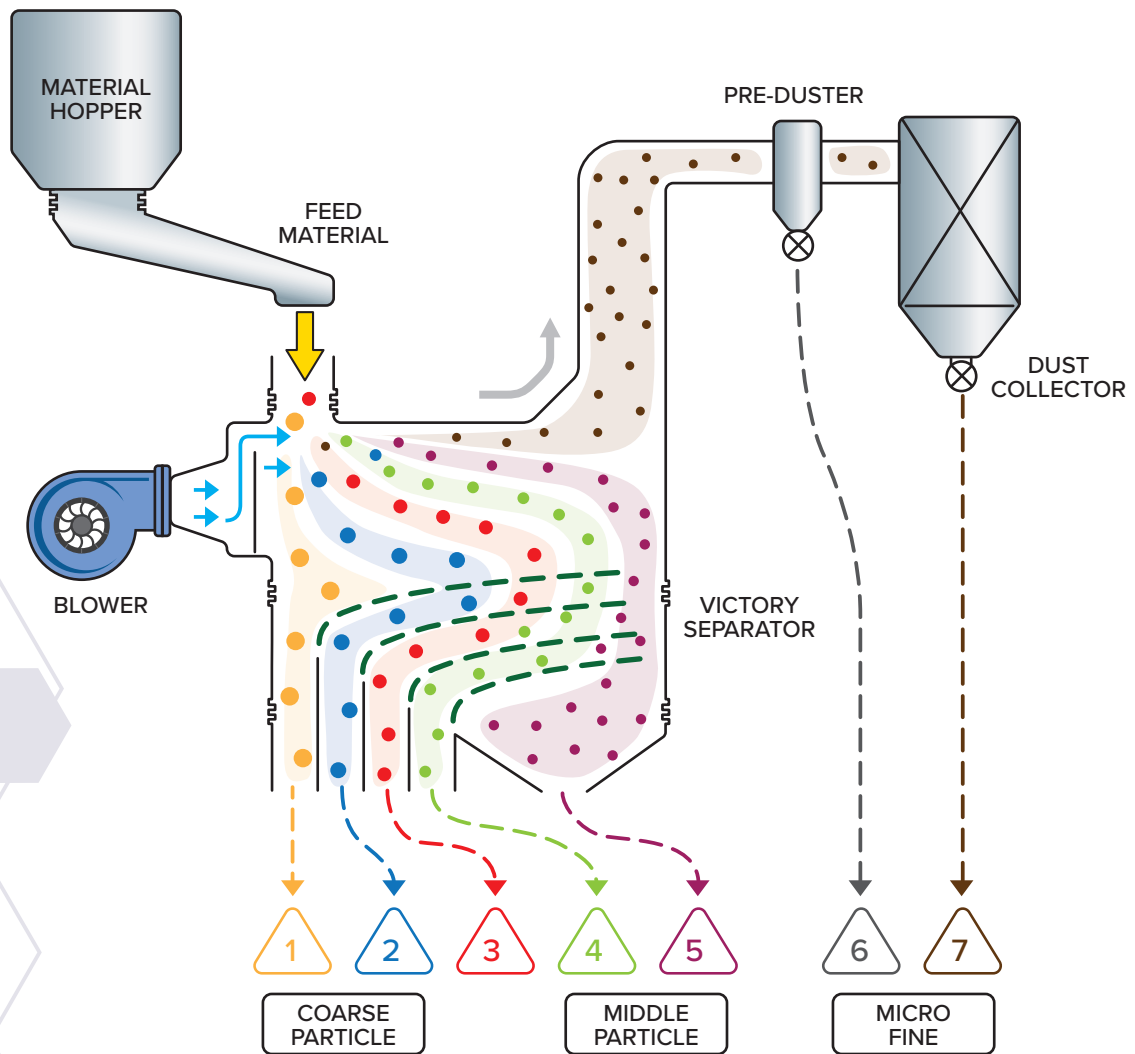
## V'Sepa Air Screen range

The Kemco V'Sepa air screen is a unique combination of high-speed air flow and mechanical screen decks. It can accurately separate aggregates from 40mm down to 75µm without washing.

- No water used means accurate dust extraction without settling ponds or wasting good product.
- Dust by-product is collected dry, giving high flexibility for alternative applications.
- Up to 7 different size fractions can be separated out simultaneously.
- Dual-air flow technology enables high throughput without blinding.
- Mechanical screen decks ensure high accuracy of screening.



V'Sepa Air Screener



Dust free



Low noise



One-step Process



Low Maintenance Design

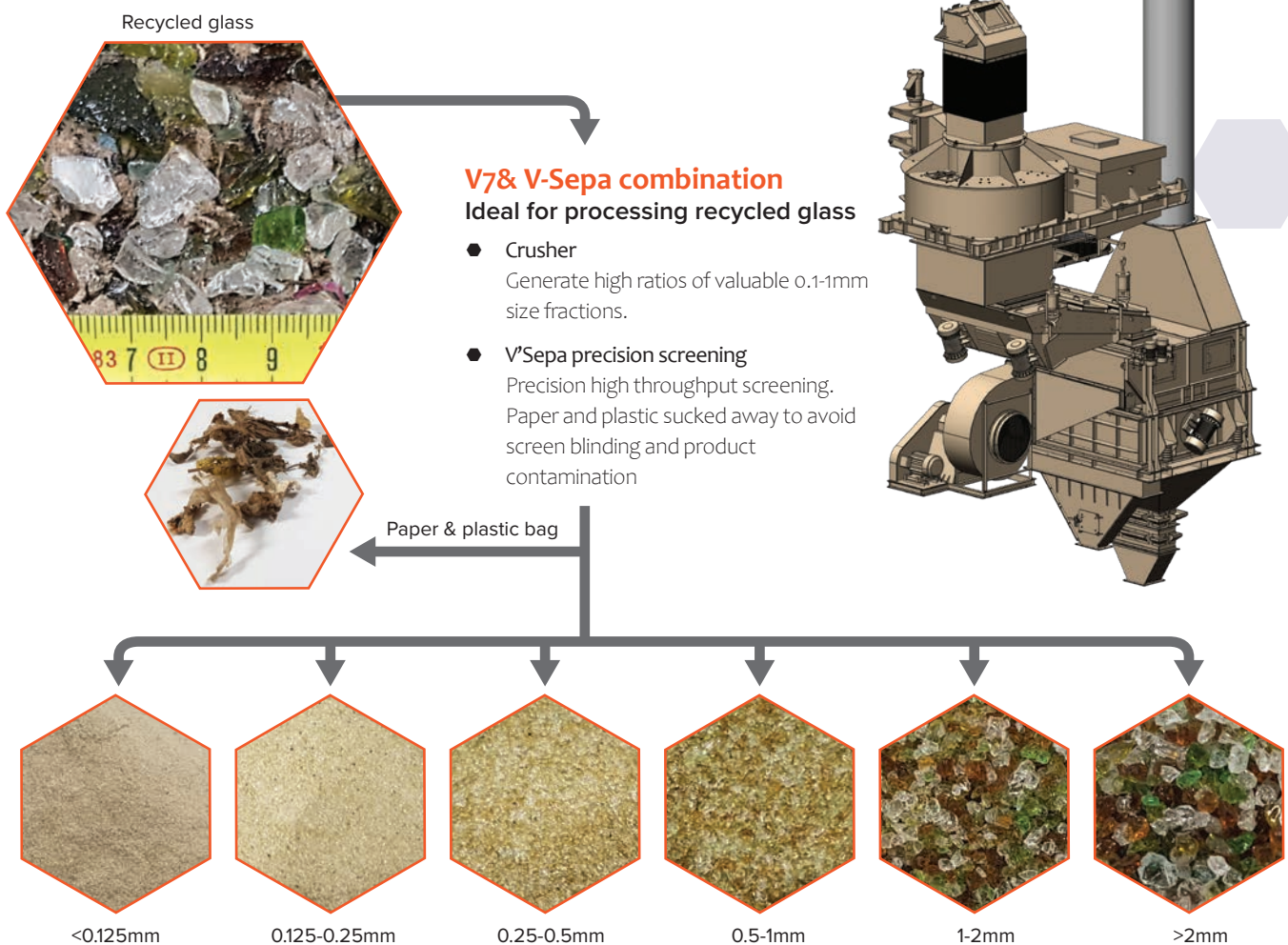
## CASE STUDY — Screening ultra-fines

- Infeed: 50% passing 0.075mm, 95% passing 0.5mm ultrafine product with a small fraction of oversize.
- Technology: V'Sepa air screen with a 0.6mm deck to remove oversized material.
- Output: Removal of all oversized particles down to 0.5mm, 99% accuracy.



## CASE STUDY — Glass processing

- Infeed: <12mm unwashed MRF glass.
- Technology: V7 crusher combined with V-Sepa screen.
- Output: Graded concrete with sugar levels reduced to 1/10,000.



## Working with KAYASAND

Kayasand plants are designed with:

- AU/NZ standards compliant for structural, mechanical & electrical design.
- Australian Mines Department compliant.
- Quality componentry for reliable operation.
- Automated control system for unsupervised operation.
- Low maintenance design for easy servicing.
- Built in diagnostics for early fault detection.
- Daily reports generated and emailed automatically.





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