

A close-up photograph of a large industrial cyclone separator, showing its metallic body, flanges, and bolts. The image is partially obscured by a dark blue overlay.

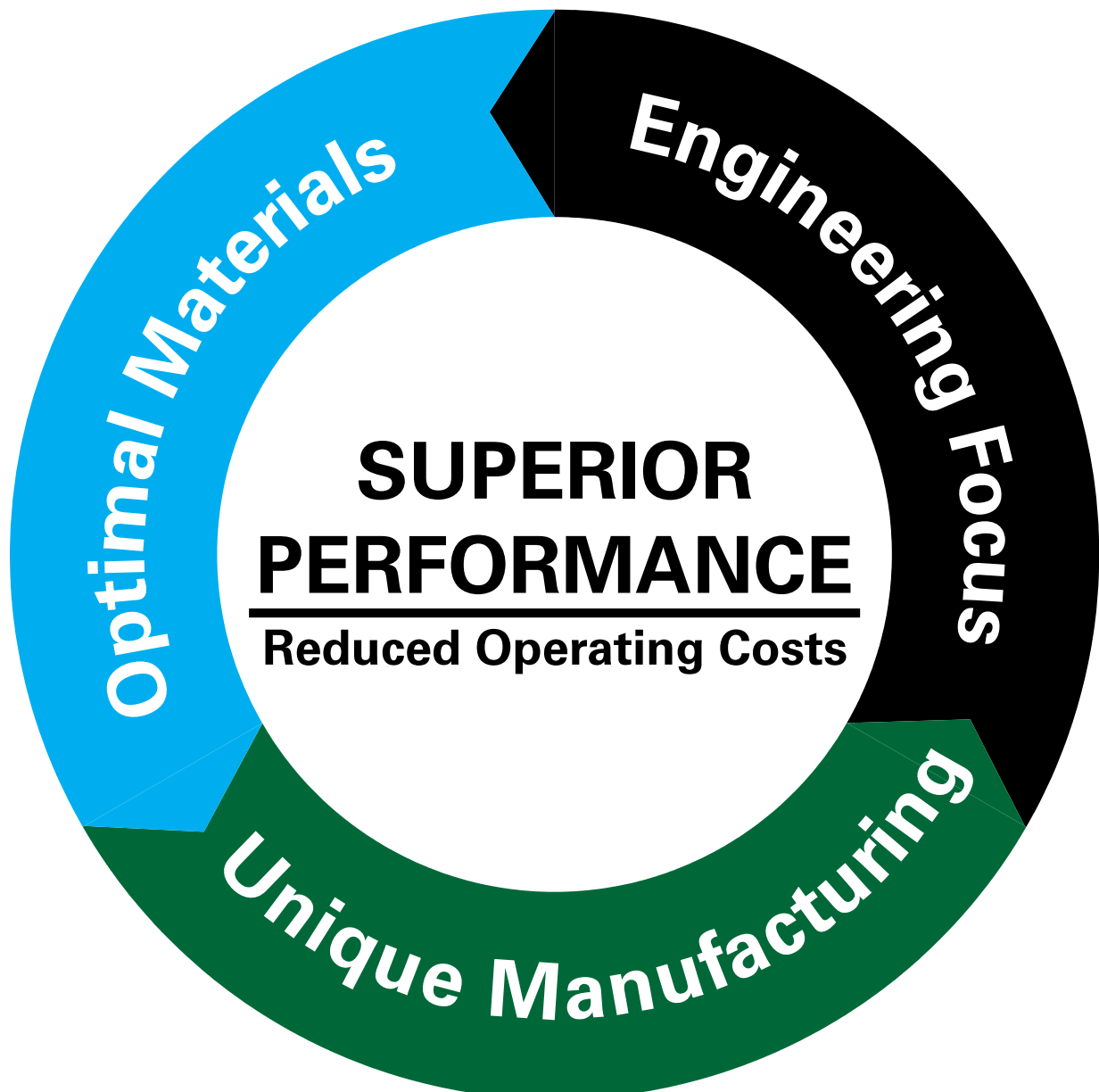
GTECH CLASSIFICATION CYCLONES (GTC)

Over 30 years experience and innovation has enabled HMA Greenbank to overcome design and manufacturing problems associated with ceramic lined equipment, such as cyclones, providing superior performance and maximising operating life.

HMA Wear Solutions is part of the HMA Group of Companies and specialises in the design and manufacture of ceramic lined equipment. HMA Wear Solutions are one of the largest manufacturing companies utilising industrial ceramics throughout Australasia. Our aim is to provide the longest possible operating life with the most cost effective ceramic solution.

HMA Wear Solutions can reduce plant operating costs through improved design, optimal ceramic selection and our unique manufacturing equipment and processes.

The GTech Classification Cyclone is the accumulation of such experience.



GTC Classification

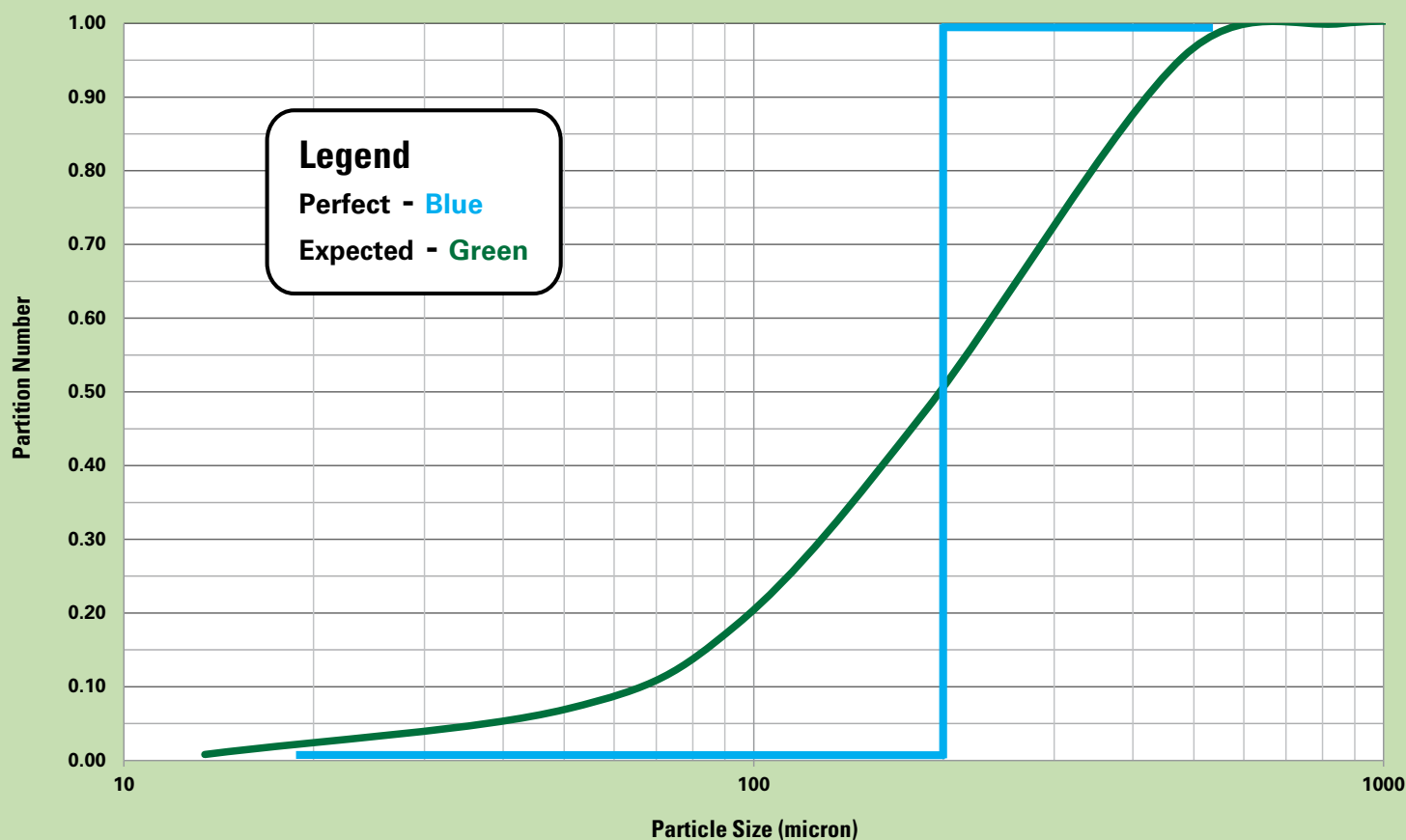
The GTech cyclone features the scrolled evolute inlet geometry designed to deliver superior performance throughout its operating life. Combine this with the zoning of ceramics in high wear areas and offering maximum operating capacities, the GTech cyclones are designed to exceed industry expectations.

The advantages of the GTech Classification Cyclone includes:

- Superior Cyclone and Lining Design
- High Separation Efficiency
- Optimal Ceramic Selection
- Reduced Operating Costs
- Engineered Tiles and Monolithics
- Ongoing Technical Support



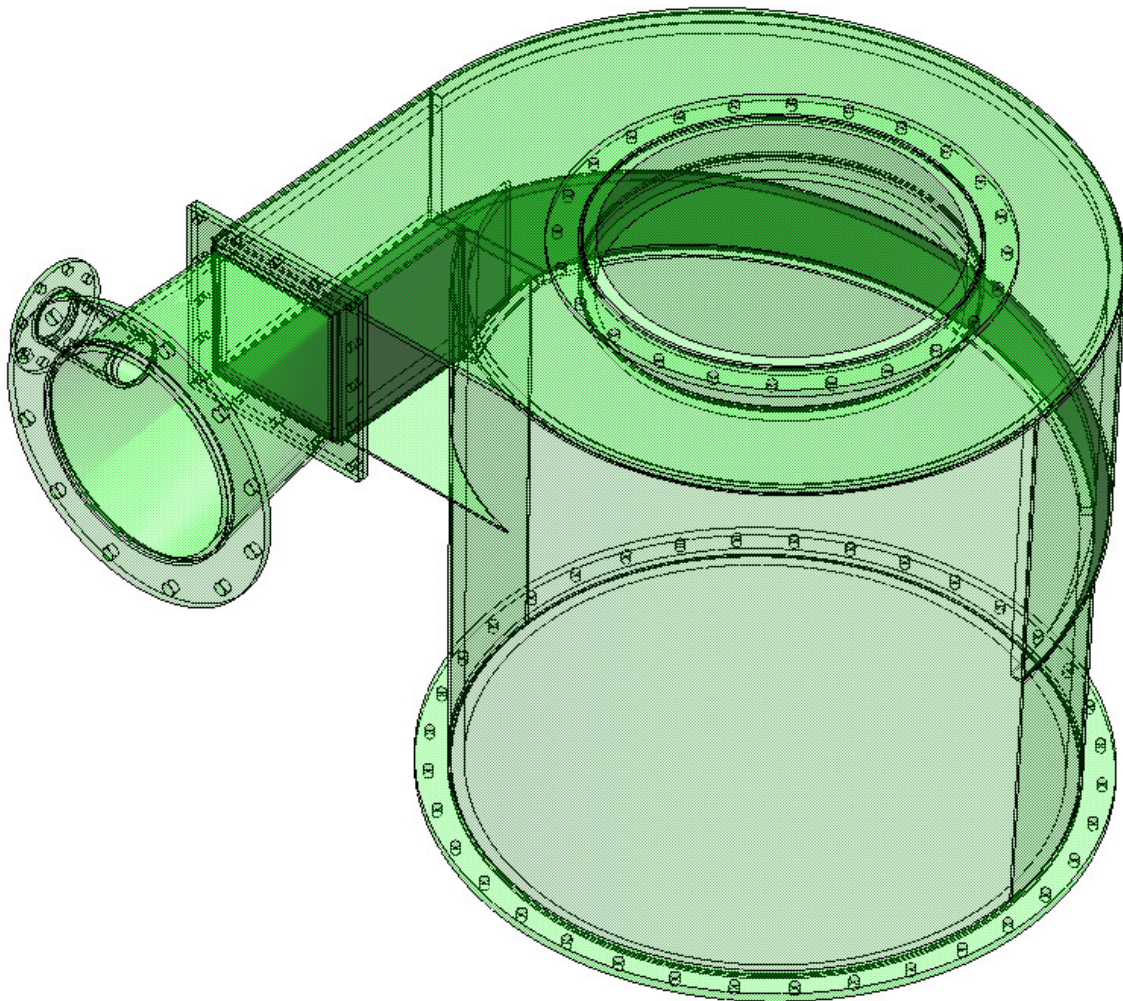
Partition Curve - Perfect vs Actual



The features of the GTech Classification Cyclone include:

- **Scrolled Evolute Entry**
Reduced cyclone wear and increased operating capacities
- **Various Cone Angles**
Affects residence time and subsequently the cyclones cut point
- **Parallel Throat Spigot**
Ensures 'as new' spigot ID is maintained for longer, thus ensuring optimal performance
- **Optimal Ceramic Selection**
Maximises operating life of the component

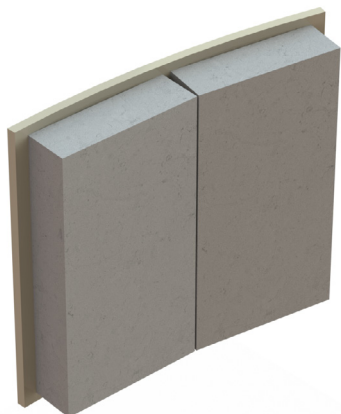
SCOLLED EVOLUTE INLET



The benefits of the Scrolled Evolute Inlet include:

- Particles follow their natural downward spiral motion due to the scroll
- Subsequently the particles align themselves before being subjected to the centrifugal forces within the cyclone
- Lower turbulence, and subsequent lower pressure drop across the inlet, results in the Scrolled Evolute having a higher capacity than a Tangential Inlet

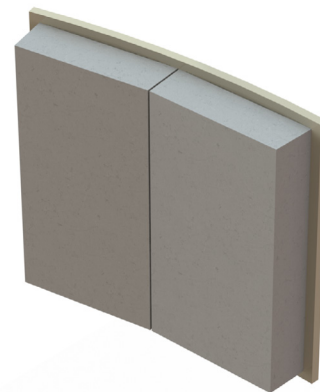
DESIGN FEATURES



Standard Tiles
(Epoxy exposed with wear)

Standard or Engineered Tiles

HMA Greenbank uses ISO pressed alumina tiles with chamfered sides locking in each tile. These tiles are designed specifically for each component to prevent catastrophic failures when compared to standard tiles. This minimises the gaps between the tiles which is the primary cause of premature lining failures.



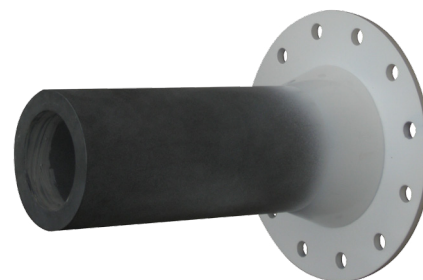
Engineered Tiles
(Tight tolerances)

SiTech Components

HMA Wear Solutions can supply complete GTech Classification Cyclones lined with SiTech. This increases the life of your cyclone dramatically compared to alumina lined cyclones. SiTech is specifically suited to the cone and spigot, where high wear rates are experienced.



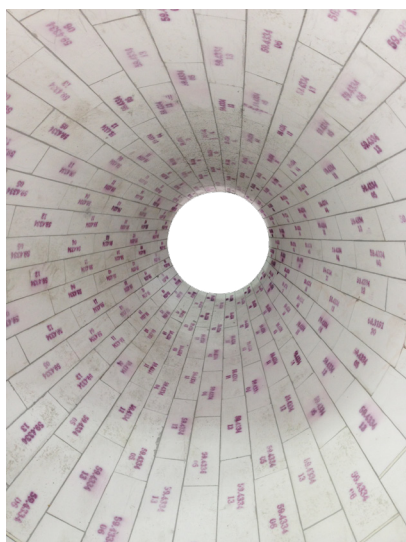
SiTech Vortex Finder



SiTech Cone

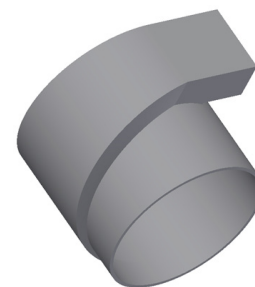
Engineered Tile Kits

GTech engineered tile kits use the optimal ceramic for the application and superior lining design. These kits are designed for the specific component, maximising wear life.



Designed Solutions

HMA Greenbank manufacture a single cone section lined with SiTech. This removes the wear point at the flange, whilst internally the liners are overlapped.

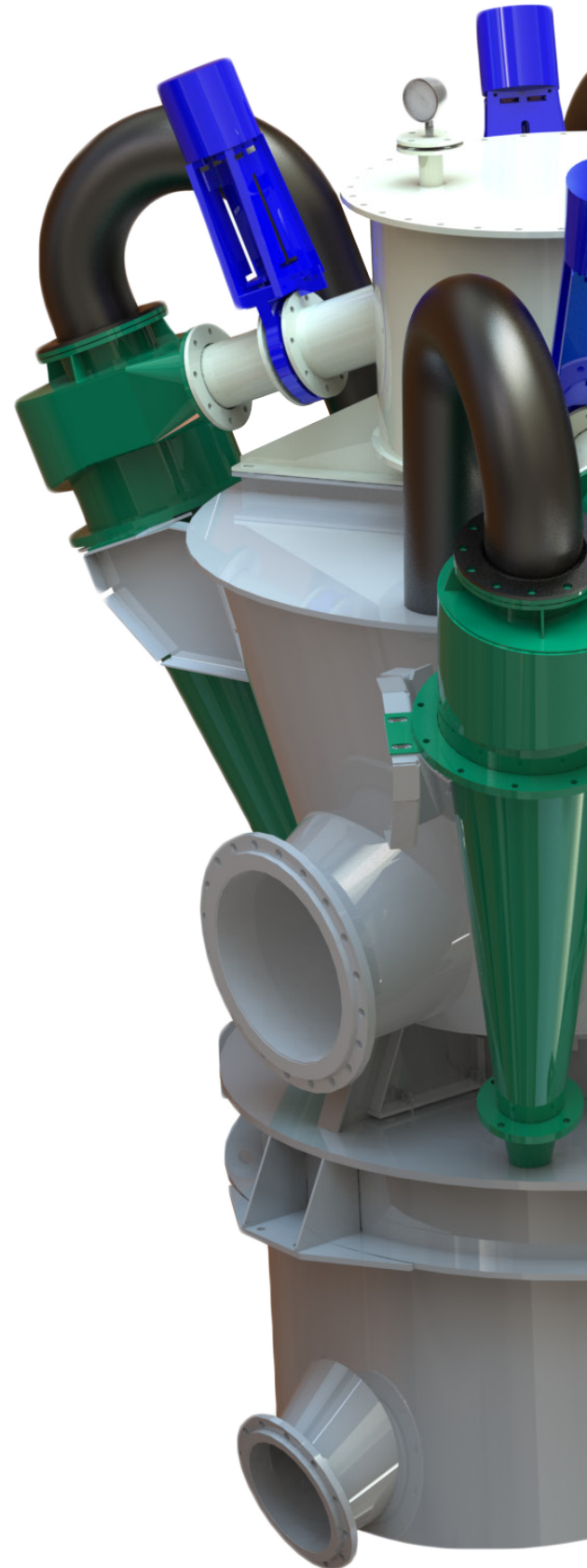


SiTech Scrolled Evolute Inlet

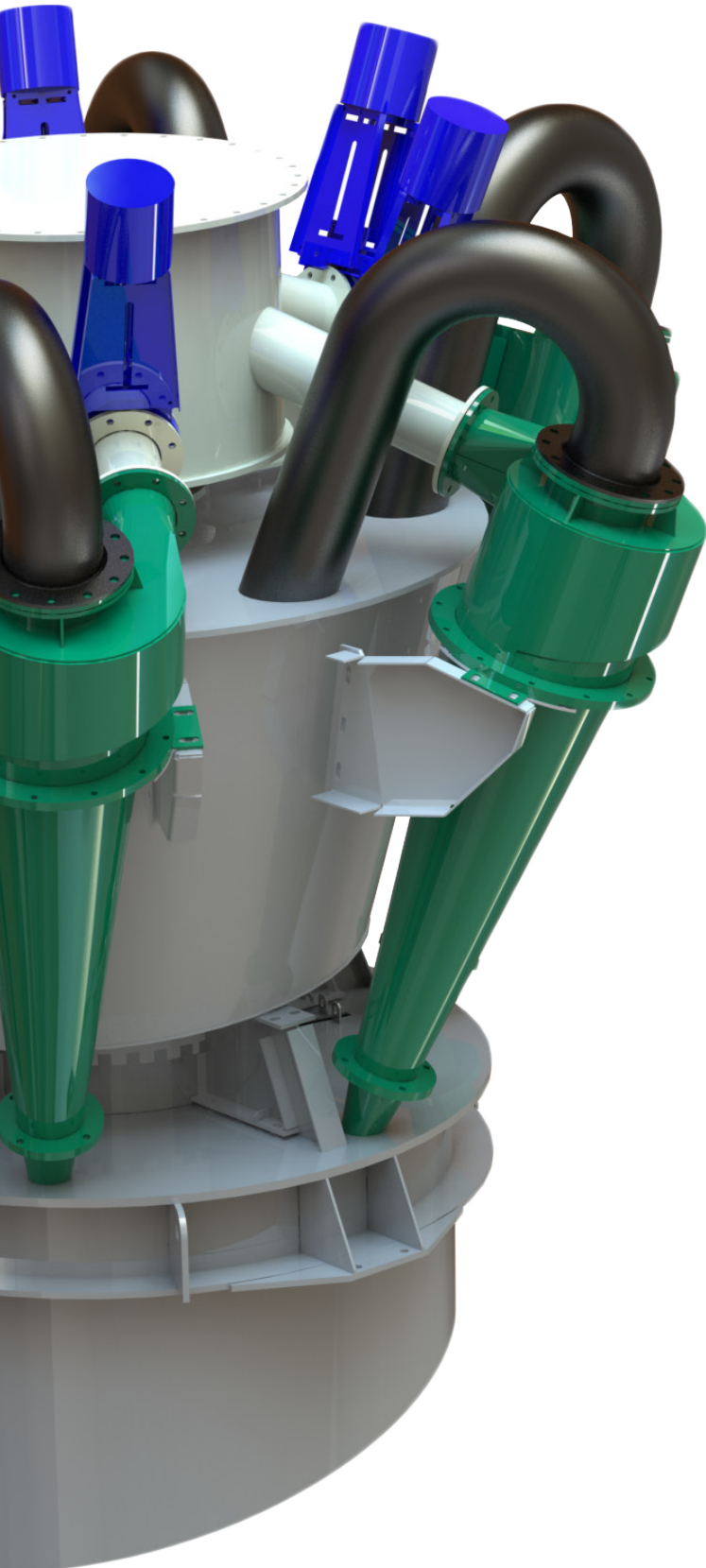


HMA Wear Solutions can provide you with the complete cyclone solution...

- Cyclone Sizing and Selection
- Cyclone Refurbishments
- Conceptual Layout Drawings
- Approved Manufacture Drawings
- Certified Structural Drawings
- Configurations to suit all Applications
- Launderers
- Pipe Work
- Installation and Supervision



COMPLETE CYCLONE SOLUTION

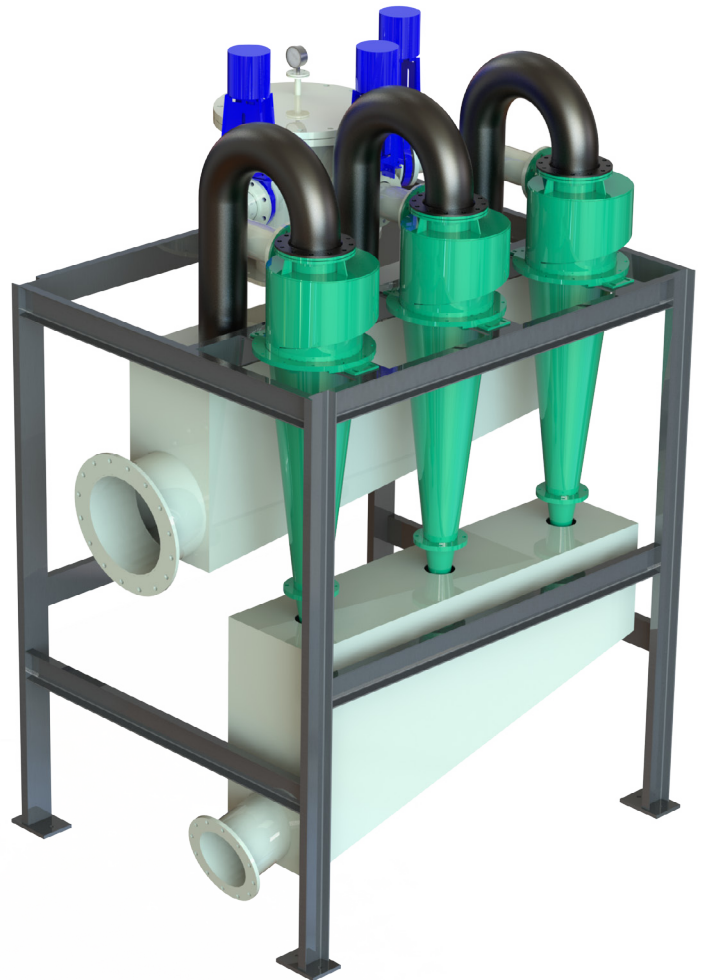


The GTech Classification Cyclones can be used in the following industries:

- Coal
- Iron Ore
- Diamonds
- Mineral Sands
- Metals

HMA Wear Solutions offers a configuration to suit all applications, with the main criteria being the quantity of cyclones and the installation footprint. Each configuration can be designed to meet client requirements. Feed to each cyclone can be controlled via pneumatic knife gate valves, which are a HMA Wear Solutions standard for this application.

A Radial Cluster is the most common configuration for classification cyclones. Such designs are compact and can handle a large quantity of cyclones which are often required. The underflow launder is designed to allow visual inspection of the spigot discharge, whilst also ensuring adequate maintenance access



Pulp distributors are designed to ensure even pulp distribution, in terms of flow and solids, between cyclones. This is key to the performance of classification cyclones. HMA Wear Solutions distributors can be lined in a variety of abrasion resistant materials suitable for the application. We also minimise the wear points associated with the distributor outlets, ensuring an extended service life. A pressure gauge is supplied with the distributor in order to monitor the feed pressure.

Both underflow and overflow launders can be designed to meet client requirements. These are typically lined with alumina tiles but other options include rubber and polyurethane. Removable inspection covers are recommended for access to the spigot, whilst it is optional for the overflow launder.

CYCLONE OPTIONS

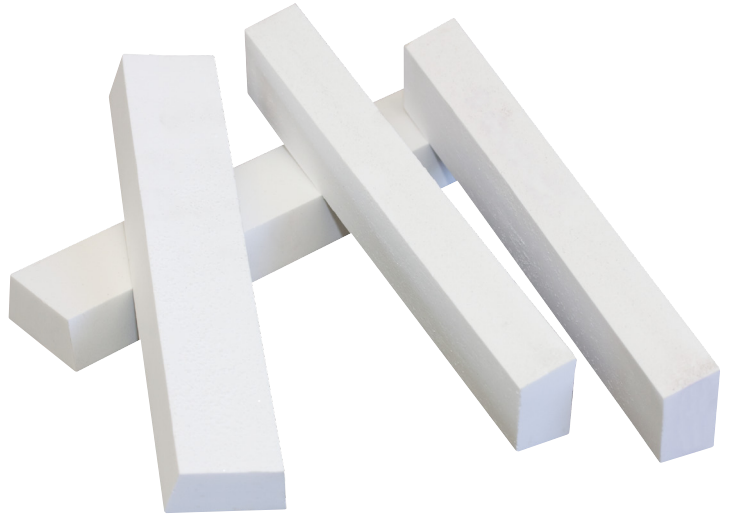
HMA Wear Solutions can supply you with a cyclone to suit your application, with a complete range of components on offer. We can select a configuration to suit the application and the quantity of cyclones required.

GTech cyclones can be supplied in a range of abrasion resistant materials such as:

- Engineered Alumina Tiles
- Alumax Monolithics
- SiTech
- 27% Chrome

High wear areas within the cyclone can be overcome by zoning the ceramics. For example we can use either SiTech or Alumax in the spigot and lower cone section while using engineered tiles for the other components. Other combinations can be used to meet our client's expectations whilst also offering a superior lining solution.

27% Chrome cyclones are used for applications where tramp metal is an issue for site. The wear rate is increased when compared to alumina lined cyclones, however it overcomes the premature failures that can be experienced with ceramic linings.



Engineered Alumina Tiles



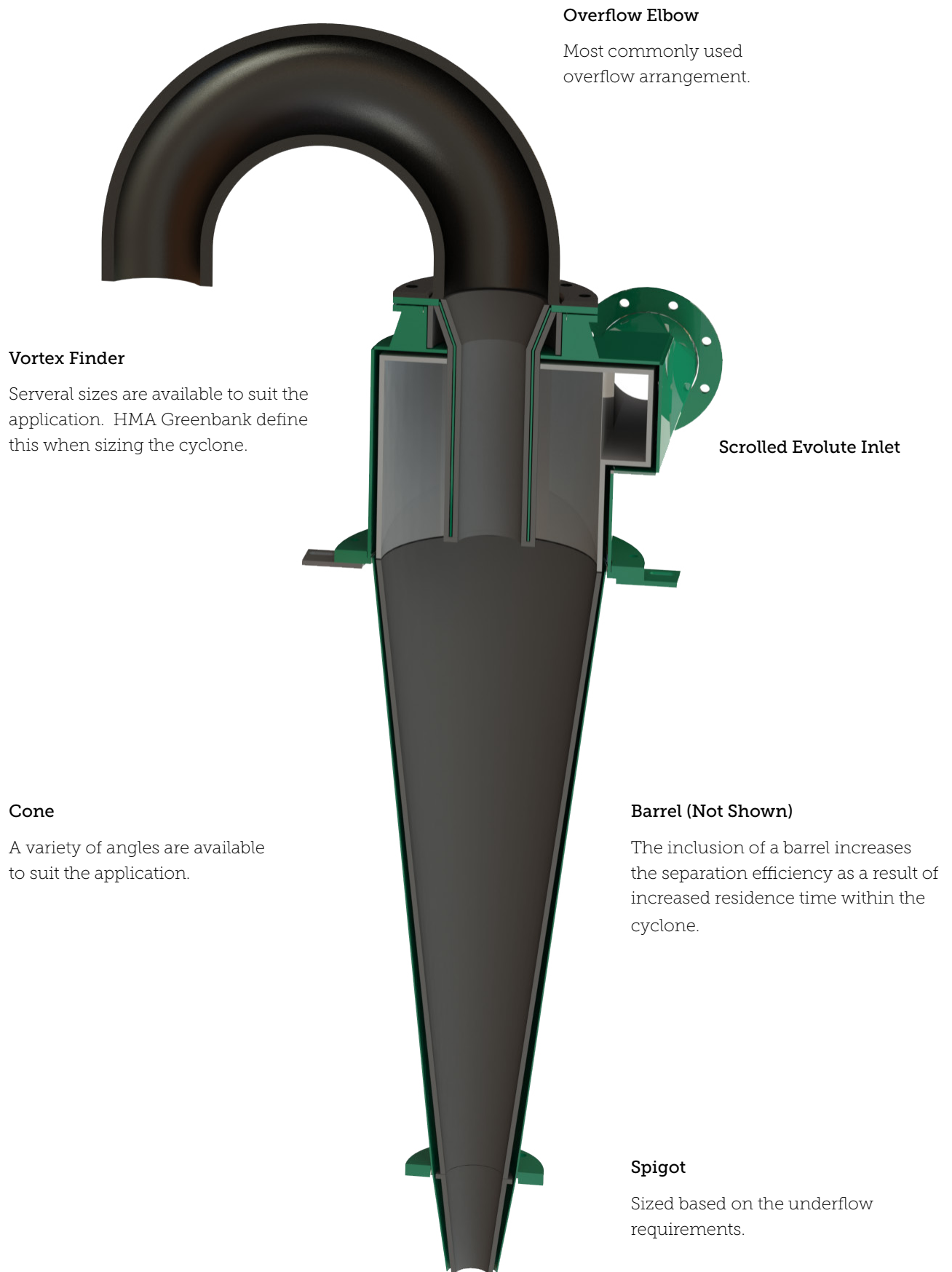
Alumax Monolithics



SiTech

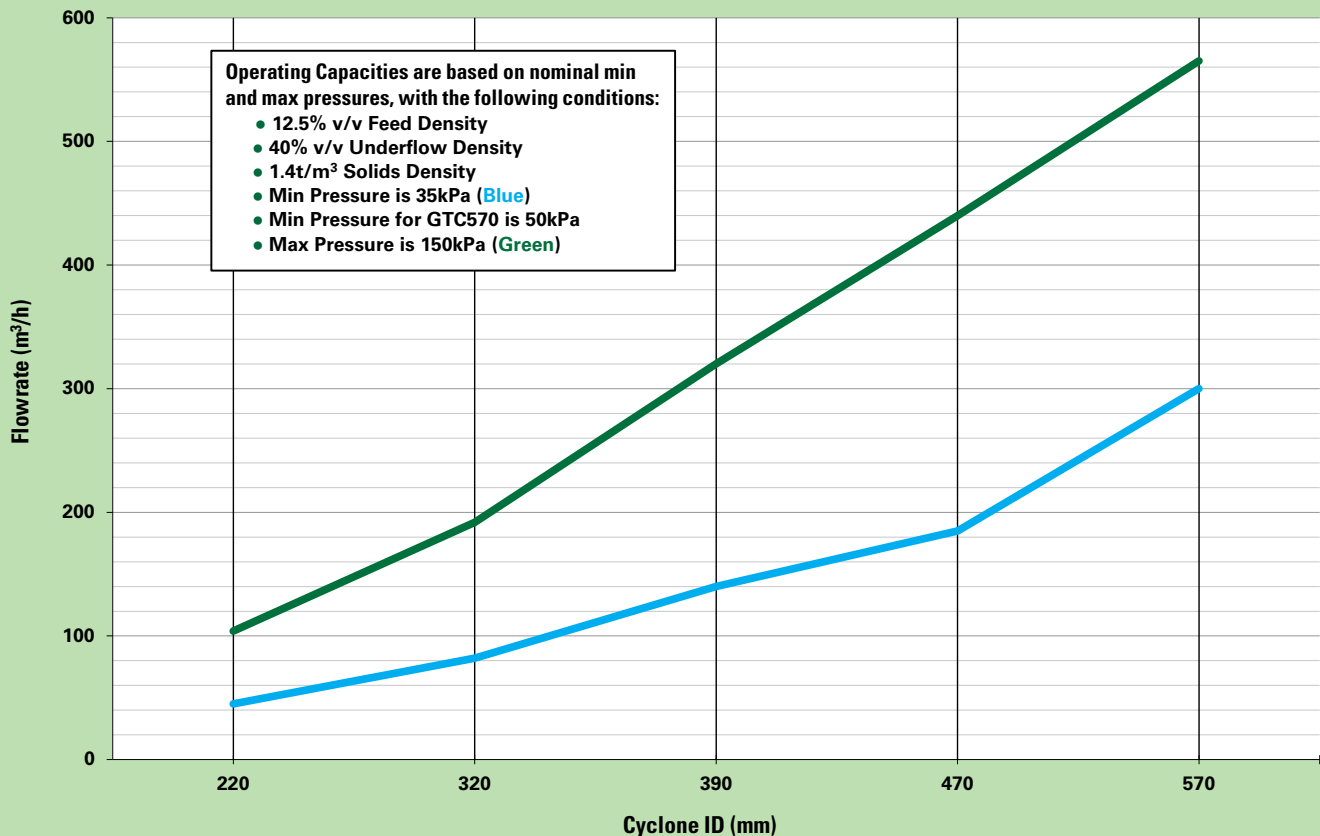


27% Chrome



SIZING INFORMATION

GTC Cyclones - Operating Capacities



Technical Support and Asset Monitoring -

HMA Greenbank offer ongoing technical support for all of our installations and refurbishments. Our experience in wear linings ensures that we can find a solution for any problem areas. We offer equipment sizing and

selection and can review existing operations in terms of cyclone performance and layout. We are able to assist clients in achieving maximum value from their plant operations and in particular their cyclone.

Enables HMA Wear Solutions to predict component life and maintain cyclone performance which exceeds our clients expectations

Enables our clients to have less unscheduled stops leading to higher productivity levels



Email: wear@hmagrp.com

QLD Tel: +61 (0)7 4998 6900

NSW Tel: +61 (0)7 4389 6191

WA Tel: +61 (0)8 6254 9500

NZ Tel: +64 (0)7 850 2610

ZAF Tel: +27 (0)10 900 2055

INDO Tel: +62 21 2278 3377

HMA GROUP

MATERIALS HANDLING

WEAR SOLUTIONS

FLOW & INDUSTRIAL

INSTRUMENTATION

POWER GENERATION

GEOTECHNICAL

WEA-DS-0022 NOV 2018

AUSTRALIA - NEW ZEALAND - INDONESIA - SOUTH AFRICA

www.hmagrp.com