



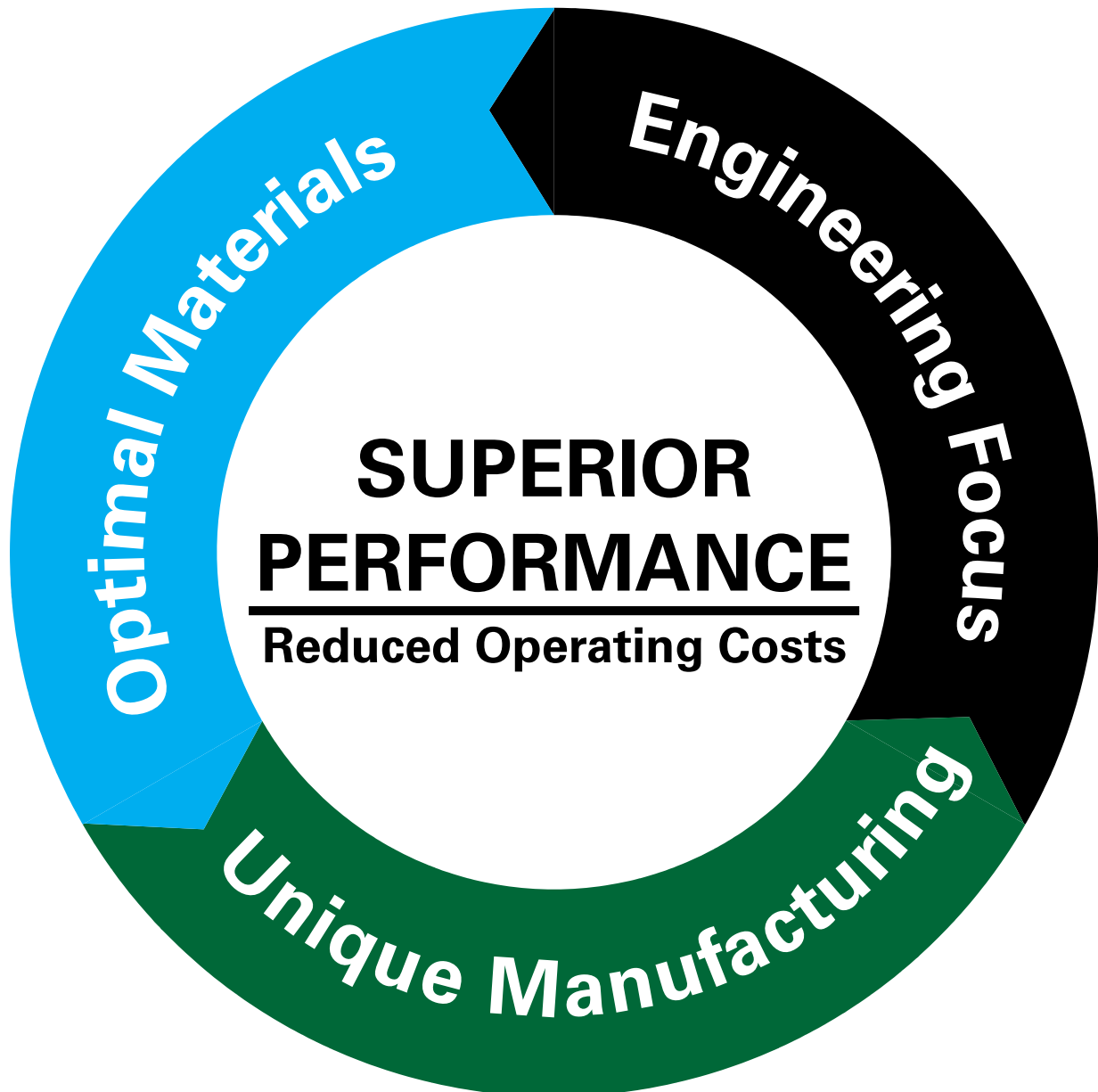
GTECH DENSE MEDIUM CYCLONES (GTD)

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 Dense Medium Cyclone is the accumulation of such experience.



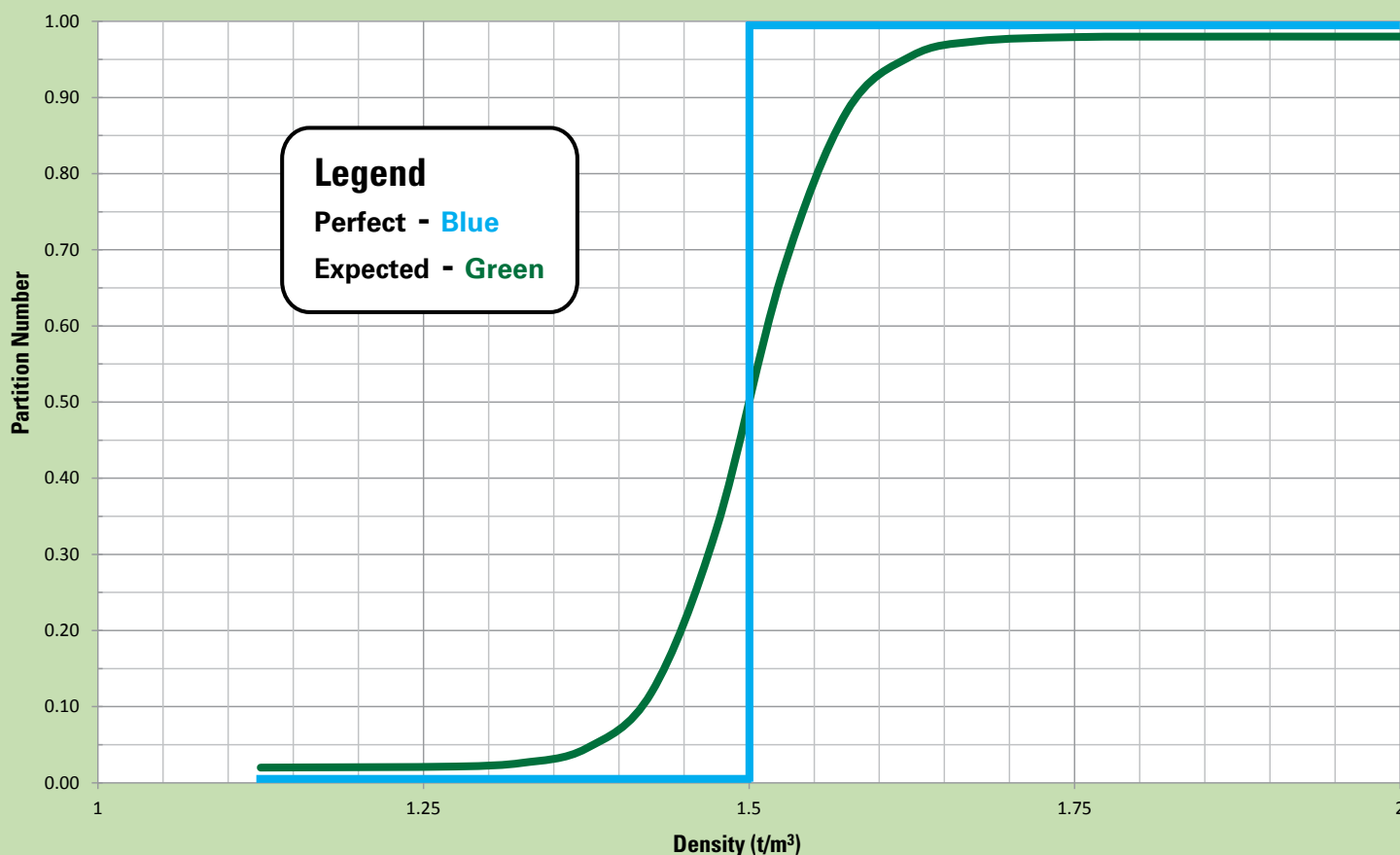
The GTech cyclone features the scrolled evolute inlet geometry designed to deliver superior performance throughout its operating life. Combine this with the zoning of ceramics in high wear areas and offering maximum operating capacities, the GTech cyclones are designed to exceed industry expectations.

The advantages of the GTech Dense Medium Cyclone includes:

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



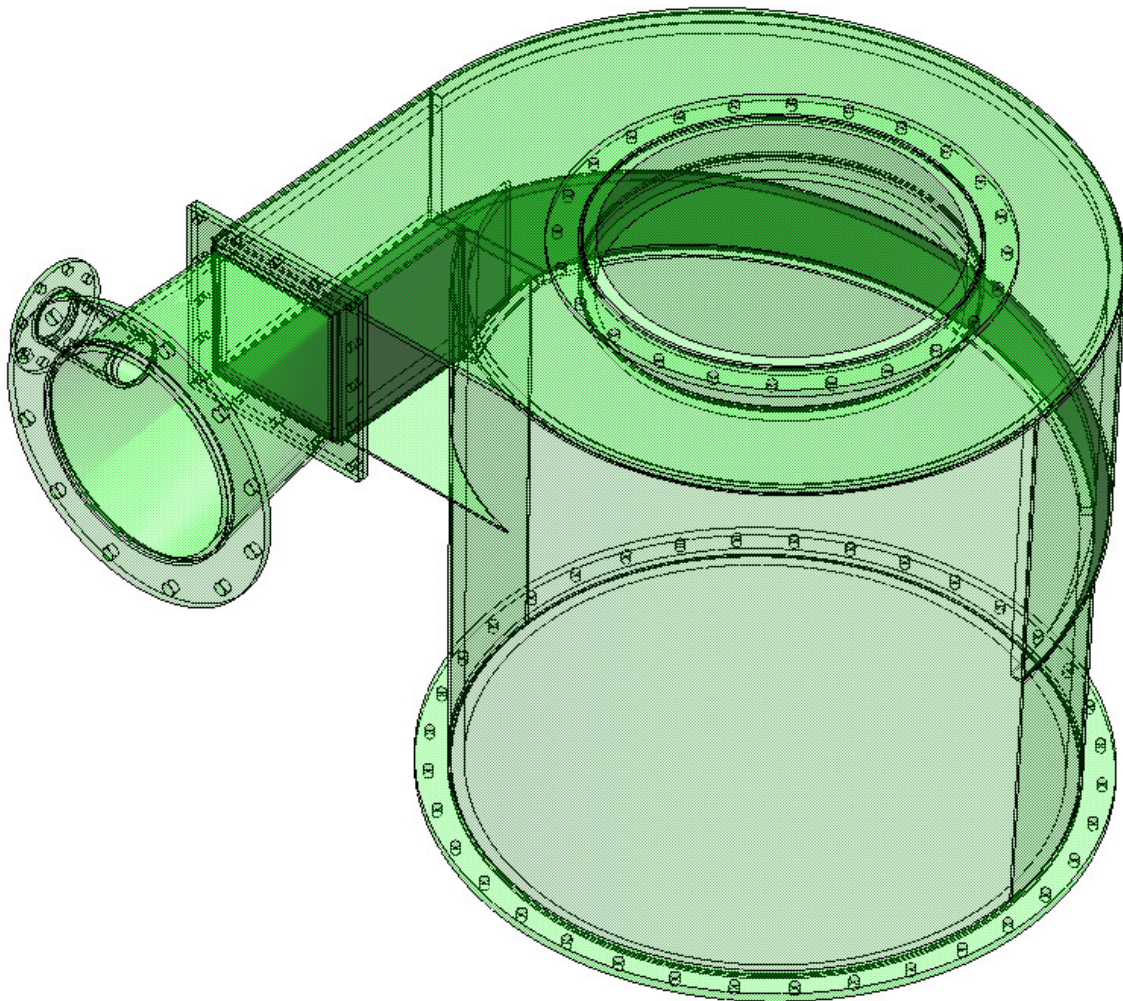
Partition Curve - Perfect vs Actual



The features of the GTech Dense Medium 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

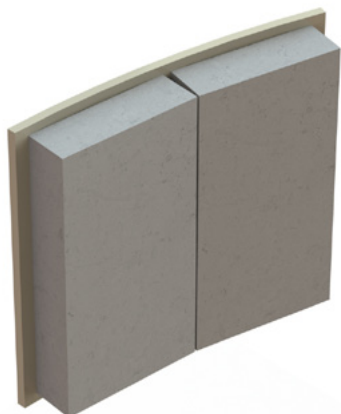
SCOLLED EVOLUTE INLET



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



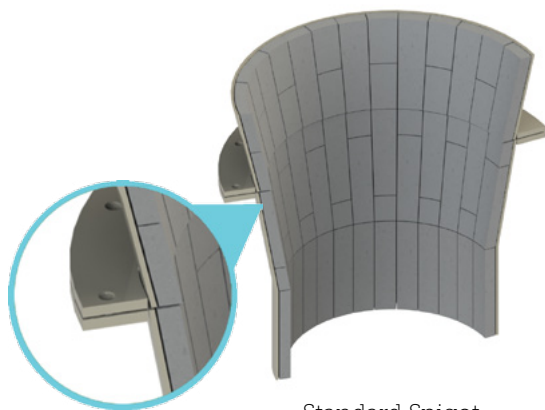
Standard Tiles
(Epoxy exposed with wear)

Standard or Engineered Tiles

HMA Wear Solutions 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.



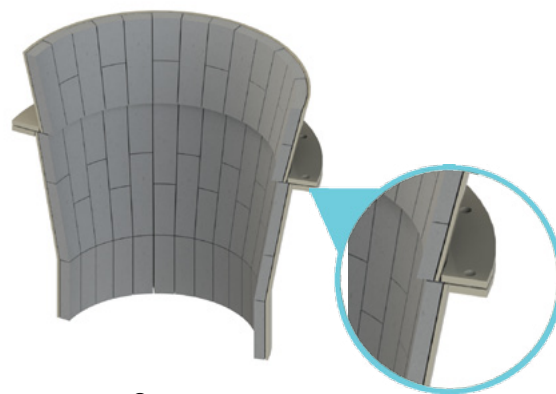
Engineered Tiles
(Tight tolerances)



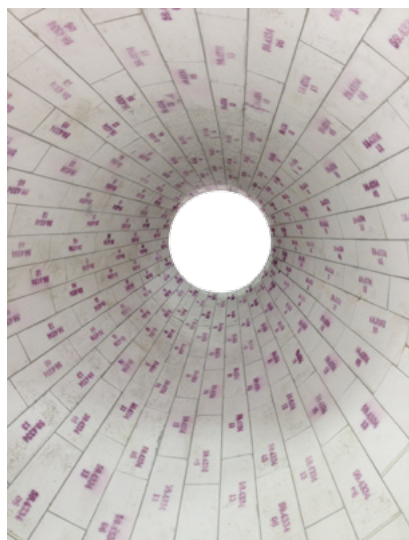
Standard Spigot

Standard and Oversize Spigots

HMA Wear Solutions offers standard and oversize spigots for Dense Medium applications. This allows for cone wear whilst maintaining both the "as new" spigot ID and separation efficiency.



Over

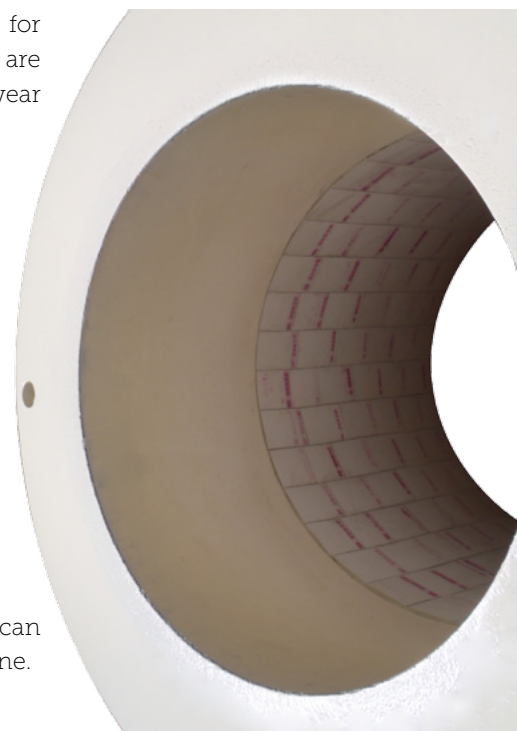


Engineered Tile Kits

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.

Ceramic Zoning

The combination of alumina tiles and monolithics can be used to zone the high wear areas within the cyclone.



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

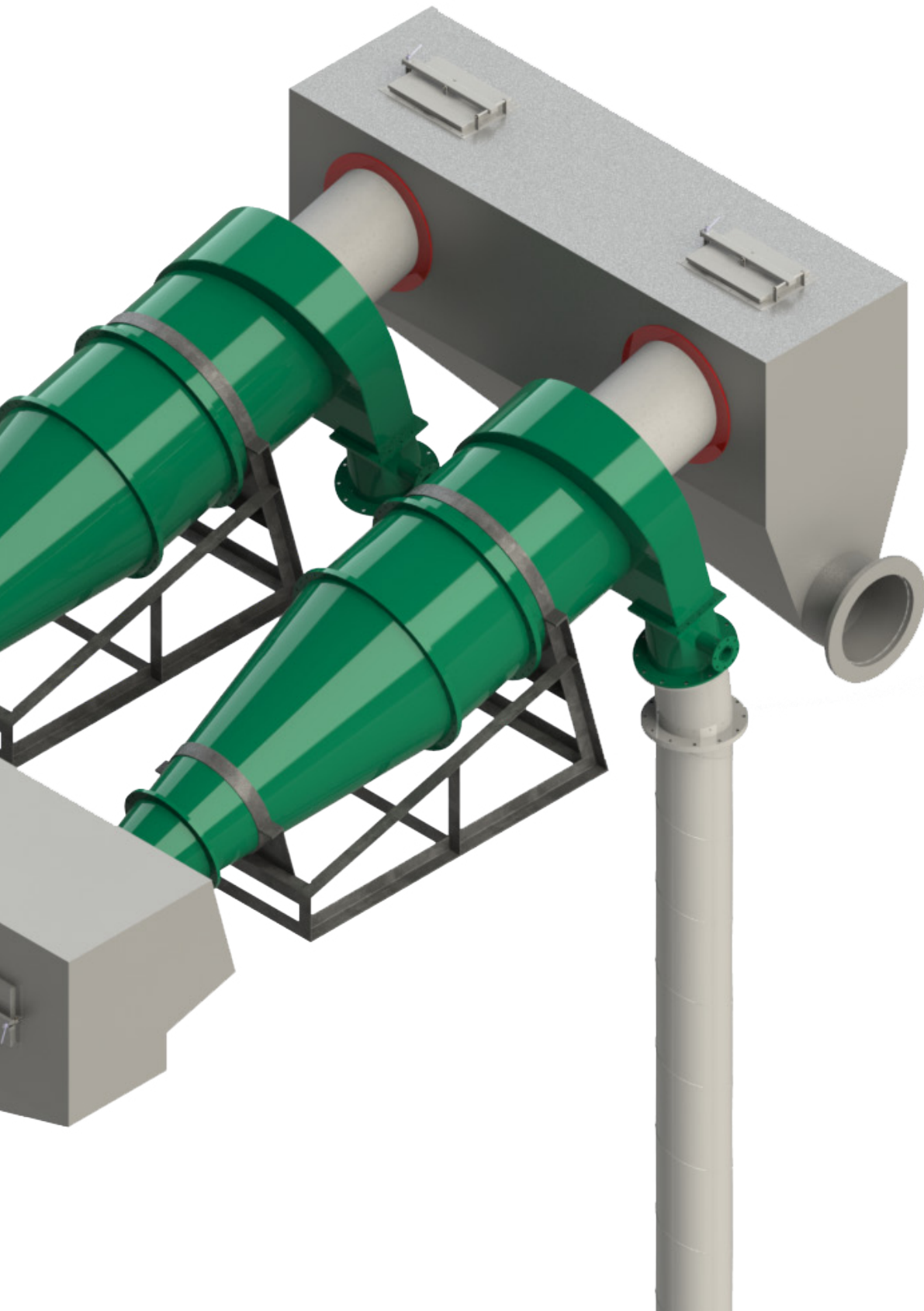
- Cyclone Sizing and Selection
- Cyclone Refurbishments
- Conceptual Layout Drawings
- Approved Manufacture Drawings
- Certified Structural Drawings
- Installation Cradles
- Launderers
- Pipe Work
- Installation and Supervision

The GTech Dense Medium Cyclones can be used in the following industries:

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



COMPLETE CYCLONE SOLUTION



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.

HMA Wea Solutions can also offer the application of AeroTech, a ceramic bonding system that eliminates adhesive failure due to vibration and delamination from the metal substrate. In applications where tramp impact or harsher operating conditions are experienced, AeroTech extends the tile lining performance and reduces "tile edge fracturing", providing a more consistent and predictable operating life.

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



AeroTech Bonding

Vortex Extension

The overflow arrangement can be selected to suit the cyclone layout without affecting performance.

Vortex Finder

Scrolled Evolute Inlet & Inlet Transition

Cone

27% Chrome components offer solutions where tramp metal is present.



Overflow Elbow



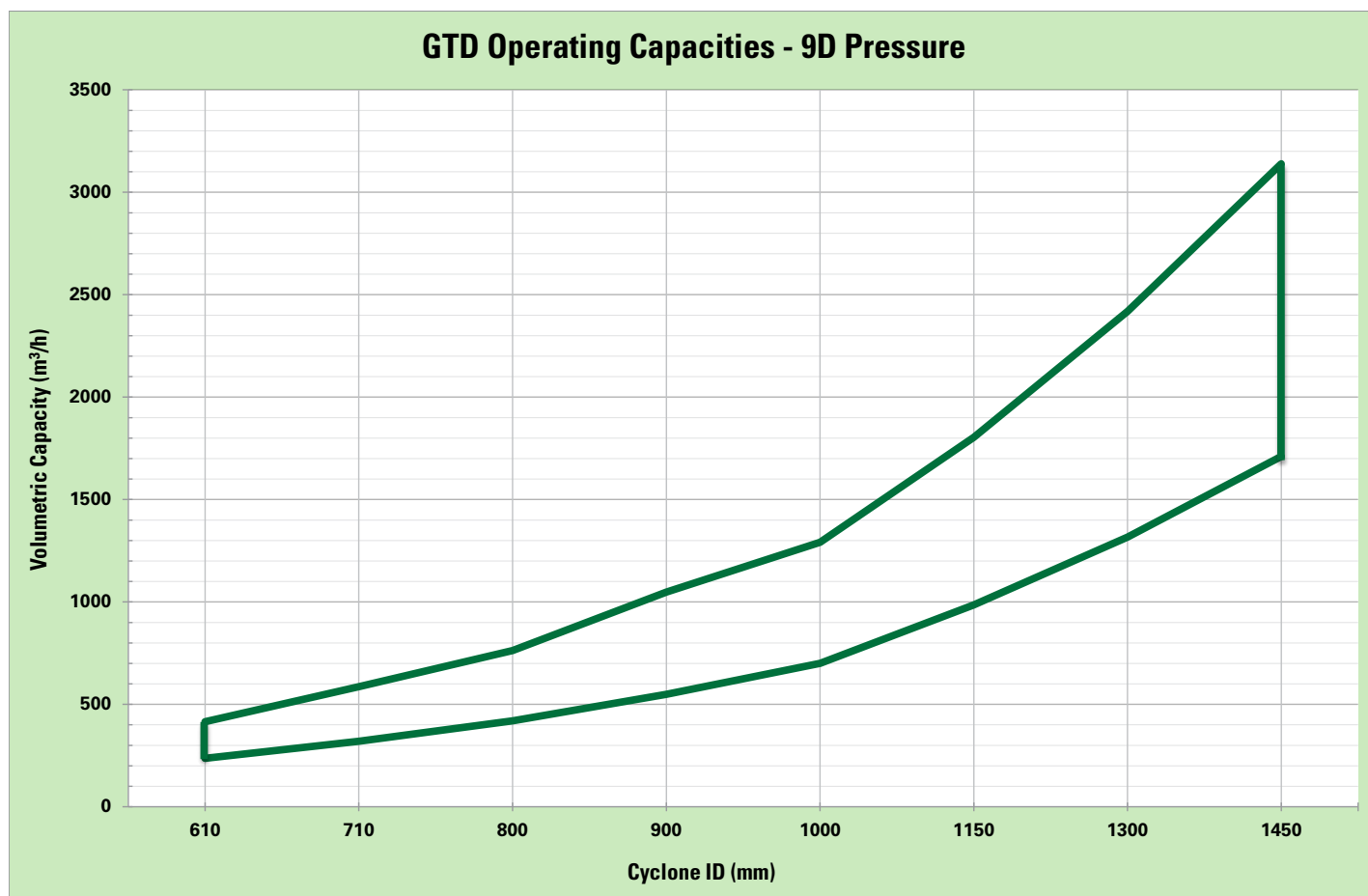
Barrel

The inclusion of the barrel increases the separation efficiency as a result of increased residence time within the cyclone.

Spigot

Size is selected based on the required capacity, which is yield driven.

OPERATING CAPACITIES



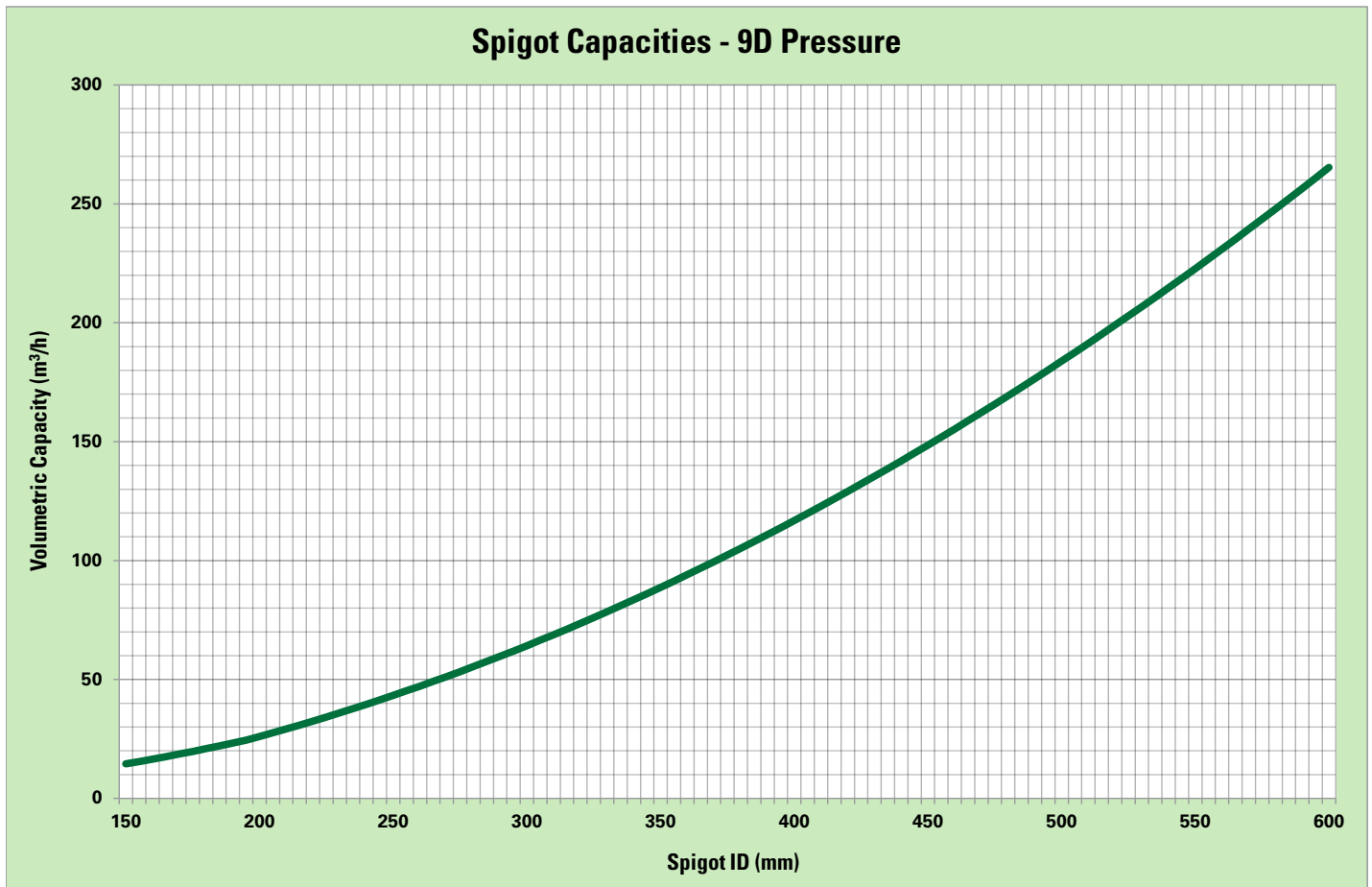
Operating capacities are affected by the following factors, all of which are selected for a specific application:

- Cyclone ID
- Vortex Finder ID (V / VH)
- Inlet ID (G / GH / GX)
- Barrel Inclusion
- Operating Pressure
- Operating Density

GTD INLET TOP SIZES

Cyclone ID	Top Size (mm)
610	54
660	58
710	62
800	70
900	82
1000	88
1150	102
1300	114
1450	128

SIZING INFORMATION



Technical Support and Asset Monitoring -

HMA Wear Solutions 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



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HMA GROUP

MATERIALS HANDLING

WEAR SOLUTIONS

FLOW & INDUSTRIAL

INSTRUMENTATION

POWER GENERATION

GEOTECHNICAL

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