Wear Indicator Tile

HMA WEAR SOLUTIONS

Predictive Maintenance System for Alumina Tile Replacement

One of the biggest issues associated with any wear lining material is understanding the thickness of the wear lining at any given time. With this in mind, HMA Wear Solutions have developed a 'wear indicator' that can be incorporated into Iso Pressed Alumina tiles.

The Wear Indicator is designed to provide a visual reference to the amount of wear that has occurred to a tile. Two x 5mm diameter indicators can be seen on the front face of each tile. 5mm diameter remains unchanged, beyond this depth, the actual diameter of the wear indicator directly relates to the depth of wear i.e. 12mm diameter = 12mm depth of tile wear. The total wear from 5mm to 17.5mm can be measured and monitored to provide accurate feedback on the linings performance and wear life. The other feature is a two-tone transition, whereby at the predefined wear depth of 17.5mm the colour of the indicator changes from black to pink. This change in colour is a visual trigger highlighting that the lining has 30% tile thickness remaining and as such replacement planning should be initiated.

Australian Patent Application Pending.

ADVANTAGES

In addition to the high abrasion resistance advantages of Iso Pressed Alumina, the HMA Wear Indicator Tile offers the following:

- Visual Inspections. Easy to identify the coloured indictors and the change in colour at a predefined wear depth.
- Measurable Wear. The diameter of the indicators directly relates to the total amount of wear, down to the change in colour, which signifies urgent replacement is required.
- Preventative Maintenance. The ability to either replace tiles based on total tile wear (access required to measure) or based on the colour change of the indicators.
- Determine Wear Rates. Based on the tonnage processed and the total wear depth measured a wear rate can be determined and assessed across different operating conditions, i.e. Feed Rate, Feed PSD, Different Seams, etc.
- HMA Wear Solutions offers a condition monitoring service with a detailed report on the wear liner condition and the expected life remaining. Facilitation of the report is through inspection to take photos of the wear lining.

WIT
Predictive Maintenance
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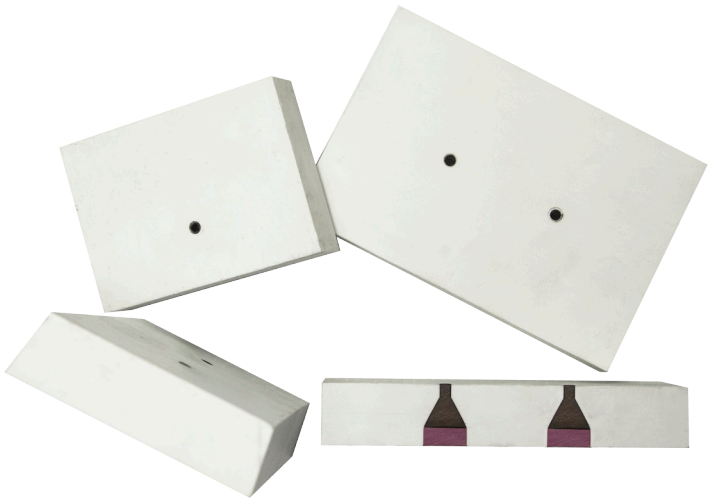

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The Wear Indicator Tile can be installed in isolated areas or across the complete item, depending on the sites requirements. Existing high wear areas are perfect for the Wear Indicator Tiles. The wear can be measured, wear rates determined and visual inspections through the colour change.

Overall the visual inspection aspect makes inspections easier, quicker and safer, avoiding the need to physically enter the chute / launder, etc. for every inspection. It essentially acts as an early warning system in the prevention of the associated costs from unexpected failures.

PHYSICAL PROPERTIES

Material Properties	Units	Value
Alumina Content	Weight %	92
Surface Finish: As Fired	mm	1.27
Density	g/cm^3	3.60
Young's Modulus @ 20°C	GPa	277
Shear Modulus @ 20°C	GPa	113
Vickers Hardness @ 20°C	GPa	10.3
Flexural Strength	MPa	310
Weibull Modulus @ 20°C	-	20
Compressive Strength @ 20°C	GPa	2.13
Fracture Toughness @ 20°C	MPa.√m	3.95
Thermal Conductivity @ 20°C	W/(m.K)	20
Coefficient of Thermal Expansion (20-800°C)	10^{-6}/K	8.36
Critical Temperature Drop ΔTc	°C	210
Maximum Use Temperature	°C	1250
Water Absorption		None
Gas Permeability		None
Grain Size (Equivalent Diameter)	µm	4.8
Manufacturing tolerance		+/- 1%

APPLICATIONS

HMA Wear Solutions Iso Pressed Alumina tiles can be formed in many different shapes. Such as our Pre-Engineered tiles with chamfered edges to suit cylindrical shapes. Thus, the applications for the Wear Indicator Tile are endless, and if wear needs to be monitored and/or measured this is your solution.

Typical applications include the following.

- Chutes / Launders
- Shrouds
- Wet and Dry Applications
- Cyclones
- Distributors

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