



# BONDED PARTICLE FILTERS (BPF)

## MOLTEN METAL FILTERS FOR ALUMINIUM DIE CASTERS AND FOUNDRIES

Pyrotek Bonded Particle Filters (BPF®) are used in aluminium gravity casting (permanent mould), pressure die casting, low-pressure, squeeze cast and high-performance sand foundries to remove inclusions. They are used in melting and casting furnaces where filters typically last one to four months.

Bonded particle filters contain high-purity silicon carbide aggregate and have excellent strength, durability and chemical resistance for long life; high thermal conductivity to minimize thermal gradients; greater filtration efficiency through a complex internal structure; and are cost-effective. All bonded particle filter raw materials, process parameters and product manufacturing lots are subject to rigorous quality control to ensure the highest possible integrity and performance.

### FILTER INSTALLATION

- Small filters are manually installed. Larger gate filters are supported by clamps and spanner bars; box filters are supported by clamps, studs and a 4-sided mounting frame. Feet can also be provided on box filters
- Filters require preheating of 202–312°C (400–600°F) for one hour. This is accomplished by placing gate filters over the sill or against a hot wall. Box filters are preheated over a dip well or in a heated transfer ladle or other heating unit
- Filters are usually installed, as rapidly as safety will allow, with molten metal present in the furnace. Priming should take less than one minute
- Filters require minimal maintenance. Any accumulated filter cake can be carefully scraped from the filter sides to extend the filter's life
- Filter change-out can be done quickly and on the foundry's schedule

### BENEFITS

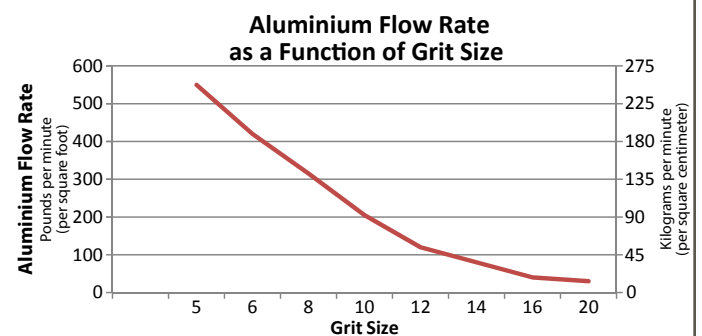
- Reduces casting scrap
- Reduces customer rejects
- Increases metal casting fluidity
- Improves casting mechanical properties
- Reduces hard spots and machine tool breakage
- Reduces microporosity
- Improves surface finishing operations on aluminium castings



The following table compares bonded particle filter grit to their corresponding ceramic foam filter (CFF) grades.

Bonded Particle Filter grit	Ceramic Foam Filter grade
6	30–39 ppi
8	40–49 ppi
10	50–59 ppi
12	60–69 ppi

The following chart displays the effect of bonded particle filter grit size on metal flow rate. These results are typical for appropriately primed clean metal.



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The following are examples of the bonded particle filter types available and the benefits of each.

Filter Type	Benefits	
Vertical Gate Filter	<ul style="list-style-type: none"> <li>No capital investment or furnace modification required</li> <li>Easily applied in melting and casting furnaces—does not require furnace draining</li> <li>Separates the dip well from the heating chamber</li> <li>Can span any well width</li> <li>Uses a compressible ceramic fibre paper gasket on the filter perimeter</li> <li>Slots to accommodate the filter may be added during furnace rebuilds</li> <li>Normal filter life is two to three months with minimal maintenance</li> </ul>	
Box Filter	<ul style="list-style-type: none"> <li>Accommodates specific manual or auto-ladling space requirements in casting furnaces and provides point-of-pour filtration for permanent moulds or pressure die casting processes</li> <li>All-filter-media construction generates full heat transfer and metal flow</li> <li>Full filtering capability allows greater efficiency from finer filters</li> <li>Useful with single vessel melting and pouring</li> <li>Supported by either legs, studs or clamped spanner bars on the furnace sill</li> <li>Many sizes and shapes are available</li> <li>Normal filter life of two to four months</li> </ul>	
Filter Pump	<ul style="list-style-type: none"> <li>Provides filtration in central melting or remelt furnaces</li> <li>Transfers filtered metal between furnaces</li> <li>Fills ladles without including remelt furnace dross</li> <li>Eliminates taphole dependency</li> <li>Increases fill rate and productivity</li> <li>Minimizes the superheating required for tap and transfer time lags</li> <li>Overcomes gravity flow barriers</li> <li>Prevents sludge and re-melt debris carryover</li> <li>Two models: 320 kg/min (750 lb/min) and 680 kg/min (1500 lb/min) maximum flow rates</li> <li>Filter life depends on usage and overall cleanliness</li> </ul>	
Stalk Tube Filter	<ul style="list-style-type: none"> <li>Direct filtration of each low-pressure casting cycle</li> <li>Significant reduction of inclusion-related scrap for cast wheels and high-performance castings</li> <li>Can be attached to cast iron or ceramic/refractory stalk tubes</li> <li>Meets many specific casting equipment and process requirement designs</li> <li>Can be used with full cylinder filter vessels</li> <li>Using cast iron or fused silica will match the filter's life to the stalk tube's life. The filter can be changed without ceramic stalk tube damage</li> <li>Durable bonded particle filters resist erosion during the fill cycle and ensure filter integrity during product life</li> </ul>	
Crucible Baffle Filter	<ul style="list-style-type: none"> <li>Separates the pour-in section from the ladling or dip-out section</li> <li>Fits various crucible sizes (a tooling charge may be required)</li> <li>Achieves filtered product quality in casting crucibles, and when melting and casting in the same crucible (if the metal level and temperature are constant)</li> <li>Useful when space constraints do not permit a box filter</li> <li>Filter placement maximizes ladling volume</li> <li>Compressible ceramic fibre gasket creates a seal and accommodates the crucible's surface irregularities</li> <li>Filter held to crucible's inner diameter with fixed lugs</li> <li>All-media construction provides excellent metal flow and long filter life</li> <li>Moderate metal level draw-down and quick refill recovery help maintain filter usability</li> <li>Easy filter change</li> </ul>	

