

Al_2O_3 ALUMINA FEEDSTOCKS



Al_2O_3 Alumina Feedstocks by HARCANE industries

Meeting the performance and cost needs of their clients, HARCANE industries is now marketing several families of Al_2O_3 Alumina feedstocks for CIM – Ceramic injection molding.

HPA – High Purity Alumina

HPA – High Purity Aluminas – from grades of 96% to 99.8% purity – are offered. The feedstocks, produced through an optimized process which highly reduces the production costs, leads to very competitive prices and performances.

The injection material keeps of course the feedstock properties that made HARCANE reputation, as:

Low viscosity, which allows to completely fulfill the prints and to perfectly weld the lines. The HARCANE feedstock properties offer to inject CIM parts with the same parameters as for plastic injection, which means with a low pressure and short injection cycles. Injection pressures are typically between 400 and 600 bars. A low viscosity is also required for multiple prints molds – molds until 16 prints are currently set with this feedstock.

Reduced cycle time. With such a short cooling time, the complete cycle time for a 1 cc part, for example, can be brought under 10 seconds. The decreased cycle time combined with a multiple prints mold, places the CIM process as an

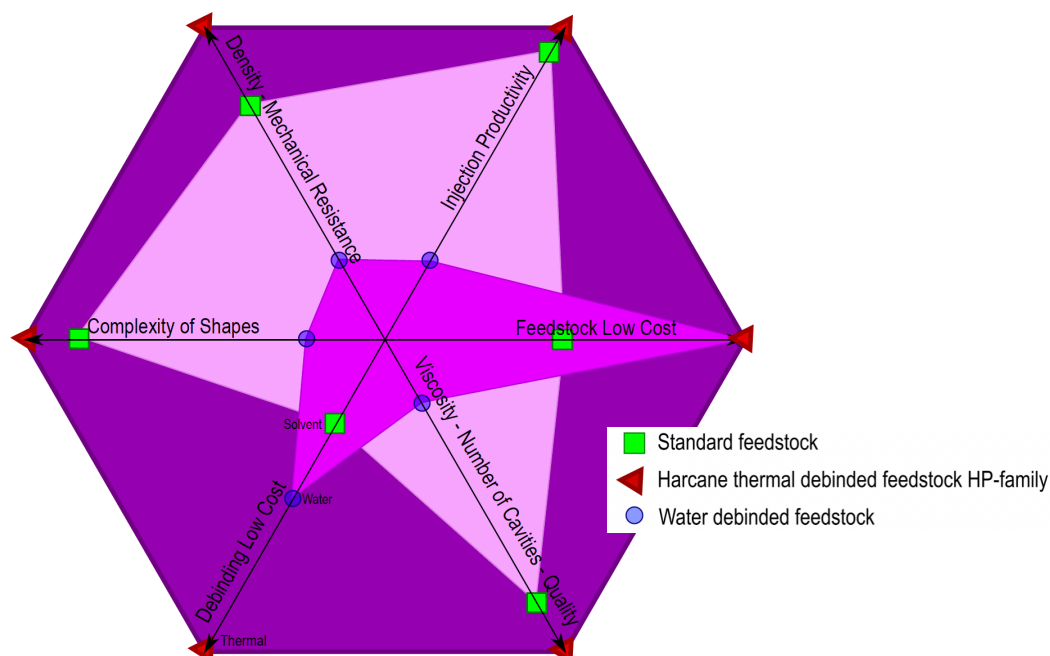
alternative to pressing processes, while adding the very important advantage of the 3D shaping.

High density and high mechanical properties, the organic materials in HARCANE feedstock formulation provide an optimal densification of the green part, resulting in a very high sintered density. The obtained density is relatively 0.01 to 0.02 g/cc higher than obtained by pressing, with a ready-to-press material.

A 100% thermal debinding material can also be performed – besides standard solvent debinding capability – which eases significantly the global production process. According to the volume of the parts and to their wall thickness, the maximum complete cycle time – including the sintering operation – is about 72 hours for small parts to 120 hours for parts with a 5mm section. An equipment adapted to a pressing process with a ready-to-press material can be used for the thermal debinding of this HARCANE feedstock.

Oversizing factors compatible with all other feedstock factors, which are typically 1.20 for a 99.8% Alumina and 1.185 for a 96% Alumina, this allows the user to keep their own molds without any modification.

Powder Supplier	Grade Purity %	Type	Density Typical
Almatis	99.8	CT3000	>3.94
Sumitomo	99.8	AES-11C	>3.93
Nabaltec	99.7	NO325	3.90
Nabaltec	96.0	NM9622	3.80
Martinswerk	96.0	KMS96bo	3.80



UHPA – Ultra-High Purity Alumina

The UHPA HARCANE feedstocks family is related to the Ultra-High Purity Aluminas.

As for High Purity Aluminas, advantages on properties are fully maintained, i.e.: **low viscosity, reduced cycle time, 100% thermal debinding material** – besides standard solvent debinding capability.

The HARCANE feedstock formulations are optimized to obtain the highest sintered densities.

The loading rates, impacting the oversizing factor, are improved to get the best densifications already at the green stage.

The HARCANE feedstock is available for the following Ultra-High Purity Aluminas:

Powder Supplier	Grade Purity %	Type	Density Typical
Sasol	99.99	AHPA-0.5	>3.95
Sasol	99.96	APA-0.5	>3.95
Sumitomo	99.99	AA-04	>3.96
Tamei	99.99	TM-DAR	>3.97
Sumitomo	99.99	AKP-30	>3.96
Baikovski	99.99	CR10	>3.96

Summary Table

	Standard material	HP alumina	UHP alumina
Typical injection pressure	500 bars	400 bars	400 bars
Thermal debinding max thickness	3mm	5mm or more according to oven type	According to powder
Price level	average	low	average
Grade 96% Martinswerk	-	✓	-
Grade 96% Nabaltec	✓	✓	-
Grade 99.7% Nabaltec	✓	✓	-
Grade 99.8% Sumitomo	✓	✓	-
Grade 99.8% Almatiss	✓	✓	-
Grade 99.99% Sasol	-	-	✓
Grade 99.99% Tamei	-	-	✓
Grade 99.99% Sumitomo	-	-	✓

