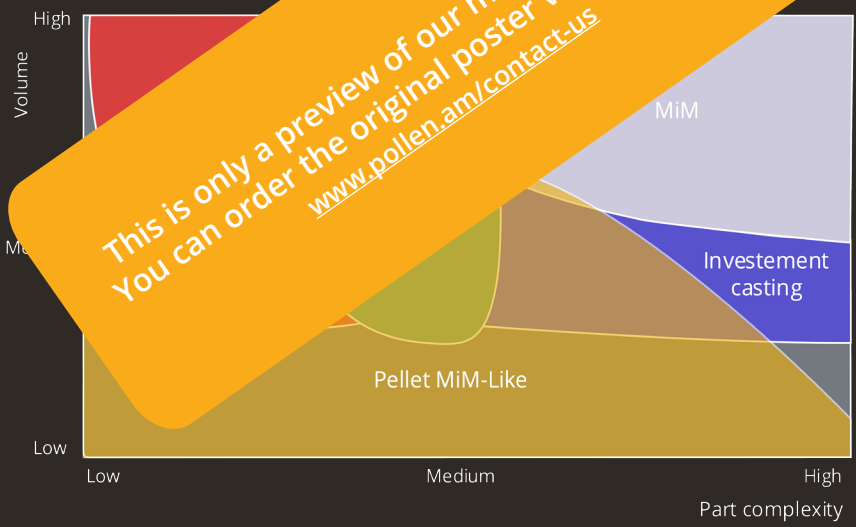
MiM & MiM-Like

Why and when using it?

It exists a wide range of metalworking t… adapted to each part complexity an… & MiM-Like are generally used t… density, high-performance…



MiM is mainly used in the automotive, medical and dental instruments, Computer and electrical applications, aerospace and defense markets, etc.
MiM-Like answers a large range of market applications from unique parts to medium series, where traditional MiM part are not competing due to mould cost.

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your chemistry inside

MiM process is best applied to small and medium size parts that are often complex in nature with high annual part volumes. Thanks to pellet MiM-like additive technology such as Pam Series MC, MiM is now economically viable from 1-unit part and with no tooling investment.

MiM & pellet MiM-like processes are compa
all type alloys such as ferrous and non-f
copper, nickel, etc.

Benefit from enhanced pro
typically 96% to 99% d
properties and can
resistance, ma
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rrosion
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ke offer design flexibility
ng process. For example,
th conventional powder metal
dary operations, using MiM process
pe parts.

Avoid sub-a blies: MiM & MiM-Like processes can be used to combine different shapes into one, to avoid assemblies and reduce labor and additional operation costs.

Nevertheless, since every process comes with its own constraints, it is necessary to take into account some MiM conception guidelines during the design phases.

Press & sinter (PM)

Competing technologies

- compaction of coarse (cheap) ductile powders to densities 85%-94%;
- delubing, sintering (almost no shrinkage);
- shapes are “2D with different thickness”, 3D details usually machined ;
- large lot sizes;
- properties dependant on density tight tolerances;
- cheap for simple medium size parts;
- mould can be very expensive for complex multilevel parts.

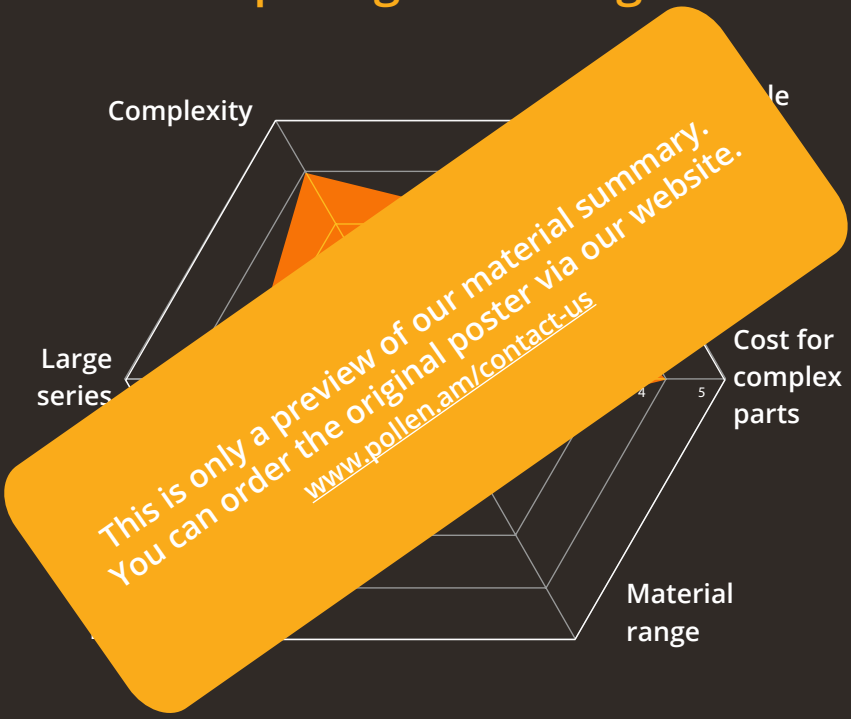
Investment casting

Competing technologies

- wax replicas of part injected in a mould, joint to form “t rees” , coated with ceramic shell, wax removed (“los t wax”), molten metal poured into ceramic shell and solidified, ceramic shell removed, parts detached and finished;
- good complexity, but difficult thin walls;
- surface defects but good tolerances;
- good for medium size lots;
- much manpower involved;
- many details have to be machined.

Die casting

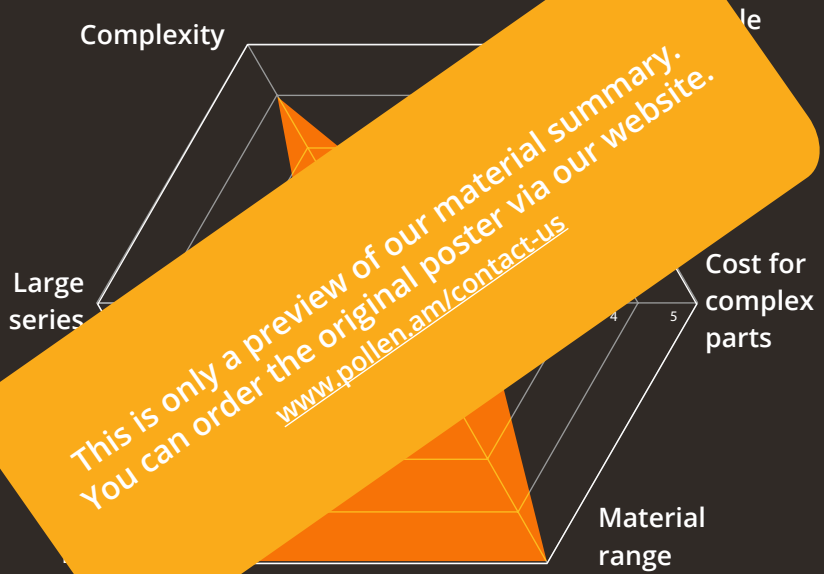
Competing technologies



- non-ferrous alloys, low melting point (aluminium, magnesium, zinc, copper, lead, tin);
- molten metal is injected in metal mould;
- high precision, high complexity (equivalent to MiM);
- low mechanical properties (linked to material choice);
- medium large lot sizes;
- cheap.

Machining

Competing technologies



- usually starting from cheap wrought bars (profiles);
- very good complexity, but each detail adds cost;
- all materials, very well known by designers;
- excellent tolerances;
- all sizes lots;
- cheaper if automated, large lots, only turning;
- scrap (metal chips) is sometimes as high as 90%;
- cost per part decreases only slightly with lot size.