

Chart P1: The material–process matrix

The great number of processes used in manufacture can be classified under the broad headings on the vertical axis of this chart, which is a matrix relating material class to process class. The material classes, listed horizontally, are the usual ones: metals, ceramics and glasses, polymers and elastomers, and composites. These generic classes are subdivided: ferrous and non-ferrous metals, thermoplastic and thermosetting polymers, and so on. The number at a row-column intersection indicates the viability of a process for a material: 2 indicates that it is viable; 1 that it could be under special circumstances; 0 that it is not viable. Because the materials and processes are listed as subclasses (not individuals) some generalizations are inevitable. For a given material-subclass the table yields two short-lists: one of viable processes, the other of those which are possible or potentially viable.

		Material Class														
		Metals					Ceramics & Glasses				Polymers & Elastomers			Composites		
		Ferrous	Refractory	Precious	Heavy	Light	Cementitious	Vitreous	Fine	Glasses	Thermosets	Thermoplastics	Elastomers	PMCs	MMCs	CMCs
Casting	Gravity	2	1	2	2	2	0	0	0	1	0	0	0	0	0	0
	Low pressure	2	0	2	2	2	0	0	0	2	0	0	0	0	1	0
	High pressure	1	0	2	2	2	0	0	0	1	0	0	0	0	2	0
	Investment	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0
Moulding	Injection	0	0	2	0	0	0	0	0	2	2	2	2	2	0	0
	Compress	0	0	2	0	0	0	0	0	2	2	2	2	2	1	0
	Blow	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0
	Foam	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0
Deformation	Cold	2	0	2	2	2	0	0	0	0	0	0	0	0	0	0
	Warm	2	0	2	2	2	0	0	0	0	0	0	0	0	0	0
	Hot	2	2	2	2	2	0	0	0	2	0	0	0	0	0	0
	Sheet	2	1	2	2	2	0	0	0	0	0	2	0	0	1	0
Machining	Turn	2	2	2	2	2	0	1	0	0	2	2	0	2	2	0
	Mill	2	2	2	2	2	0	1	0	0	2	2	0	2	2	0
	Grind	2	2	1	2	2	0	2	2	2	0	0	0	0	2	2
	Polish	2	2	2	2	2	0	2	2	2	0	0	0	0	1	2
Powder Methods	Sinter/HIP	2	2	2	2	2	0	2	2	1	0	2	0	0	2	2
	Slip cast	0	0	0	0	0	0	2	2	1	0	0	0	0	0	1
	Spray forming	2	2	2	2	2	0	2	2	2	2	2	0	2	0	0
	Hydration	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Composite Forming	Lay-up	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
	Mould	0	0	0	0	0	0	0	0	0	2	2	2	2	0	0
	Squeeze-cast	1	0	0	2	2	0	0	0	0	0	0	0	0	2	0
	Filament wind	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
Molecular Methods	PVD	0	2	2	2	0	0	0	2	0	0	0	0	0	1	0
	CVD	0	2	2	2	0	0	0	2	0	0	0	0	0	1	2
	Sputtering	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0
	Electroforming	1	0	2	2	0	0	0	0	0	0	0	0	0	0	0
Special Methods	Electrochemical	2	2	2	2	2	0	0	0	0	0	0	0	0	2	0
	Ultrasonic	1	2	0	0	0	0	2	2	2	0	0	0	0	0	2
	Chemical	2	2	2	2	2	0	2	2	2	0	0	0	0	0	0
	Thermal Beam	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2
Fabrication	Weld/braze	2	2	2	2	2	0	0	0	0	0	2	0	0	0	0
	Adhesive	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Fasten	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Microfabrication	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2