Manufacturing Processes

University Mechanical Engineering · Vocabulary in context

Word	Example
manufacturing processes	Choose **manufacturing processes** by time, force and tolerance.
tolerance /ˈtɒlərəns/	The **tolerance** is the allowed difference between the size limits.
fit /fɪt/	A clearance **fit** lets the shaft turn in its bore.
engineering drawing	An **engineering drawing** gives every size its limits.
orthographic views	**Orthographic views** show the part from the front, top and side.
datum	Measure every feature from the **datum** that locates the part.
hole-basis system	In the **hole-basis system**, the hole's lower limit is the nominal size.
root sum of squares	The **root sum of squares** gives a smaller, statistical stack tolerance.
clearance fit	A **clearance fit** always leaves a gap between shaft and hole.
casting /ˈkæstɪŋ/	In **casting**, molten material solidifies inside a mould.
Chvorinov's rule	**Chvorinov's rule** says freezing time grows with the square of V/A.
casting modulus	A thick section has a large **casting modulus** and freezes slowly.

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riser	The **riser** must freeze last to feed the shrinking casting.
forming /ˈfɔːmɪŋ/	**Forming** shapes solid metal by plastic flow.
flow stress	The **flow stress** rises as the metal strain-hardens.
machining	**Machining** removes metal to reach tight tolerances.
cutting speed	A higher **cutting speed** shortens tool life sharply.
feed	Halving the **feed** quarters the surface roughness.
depth of cut	The **depth of cut** is how far the tool enters the work.
material removal rate	The **material removal rate** is speed times feed times depth.
Taylor's tool-life equation	**Taylor's tool-life equation** links cutting speed and tool life.
welding	**Welding** fuses the parent metal with heat.
heat input	High **heat input** widens the heat-affected zone.
fillet weld	A **fillet weld** joins two plates at a right angle.
throat	A fillet weld fails in shear through its **throat**.
adhesive bonding	**Adhesive bonding** is strong in shear but weak in peel.

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additive manufacturing	**Additive manufacturing** builds a part layer by layer.
staircase effect	The **staircase effect** roughens sloped printed surfaces.
cusp height	Thinner layers reduce the **cusp height** on a slope.
anisotropy	Printed parts show **anisotropy**: they are weaker across the layers.
process capability	**Process capability** compares the process spread with the tolerance.
statistical process control	**Statistical process control** spots a problem before bad products are sent out.
process plan	The **process plan** lists every operation in order.

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