Your notes

GCSE Design and Technology: revision notes

Material management, tolerances and tools

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Tolerances and quality control

- A **tolerance** is the acceptable range a size can vary by, such as 50 mm ± 0.5 mm, meaning anything from 49.5 mm to 50.5 mm is acceptable.
- **Tolerances** make sure parts fit together, especially in mass production.
- **Quality control** checks parts during and after manufacture, using measuring tools, gauges and visual checks.

Material management

- Plan cutting to reduce waste: arrange parts closely (**nesting** or tessellating shapes) on a sheet.
- Use a **cutting list** that sets out every part, its size and material.
- Mark out from a **datum** (a straight edge or line that all measurements are taken from), so errors don't add up.
- Include an allowance for cutting (the **kerf** of the saw) and for joints or seams.

Marking-out and specialist tools

- Marking out: steel rules, **try squares**, marking gauges (timber), scribers and odd-leg callipers (metal), and pencils, pens or tailor's chalk.
- Cutting and shaping: saws, snips, files, planes and scissors; machines such as lathes, milling machines and laser cutters.
- Holding: vices, clamps and jigs keep work steady and safe.
- Safety: wear goggles and aprons, use guards, tie back hair and follow risk assessments.

Key terms

Tolerance	The acceptable range a measurement can vary by.

Datum	A reference edge or line that all measurements are taken from.
Nesting	Arranging shapes closely on a sheet to reduce waste.
Cutting list	A list of all the parts needed, with sizes and materials.
Quality control	Checking products meet the required standard.
Kerf	The width of material removed by a saw cut.
Try square	A tool for marking and checking right angles.

Your notes

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. A part is 60 mm ± 1 mm. Which size is acceptable?
2. What is a datum?
3. What is nesting?
4. Why are tolerances important in mass production?
5. Which tool marks a line parallel to the edge of timber?
6. Which tool is used to mark lines on metal?
7. What is a cutting list?
8. What is the kerf?

Answers

1. 60.8 mm
2. A reference edge or line that measurements are taken from
3. Arranging shapes closely on a sheet to reduce waste
4. They make sure parts fit together
5. A marking gauge
6. A scriber
7. A list of all parts with sizes and materials
8. The width of material removed by a saw cut

What to do next

Practise 10 questions on this topic

Try 4 exam questions, with mark schemes

Read the lesson, one step at a time

Free revision for GCSE and KS3 at lycolearn.co.uk. Some notes are for one exam board only, and say so in brackets.