

1.6 Exercises

10 Chapter 1 *Introduction: materials—history and character*

Exercise E1.1 Use Google to research the history and uses of one of the following materials:

- Tin
- Glass
- Cement
- Titanium
- Carbon fiber.

Present the result as a short report of about 100–200 words (roughly half a page).

Exercise E1.2 What is meant by the *design-limiting properties* of a material in a given application?

Exercise E1.3 There have been many attempts to manufacture and market plastic bicycles. All have been too flexible. Which design-limiting property is insufficiently large?

Exercise E1.4 What, in your judgement, are the design-limiting properties for the material for the blade of a knife that will be used to gut fish?

Exercise E1.5 What, in your judgement, are the design-limiting properties for the material of an oven glove?

Exercise E1.6 What, in your judgement, are the design-limiting properties for the material of an electric lamp filament?

Exercise E1.7 A material is needed for a flexible tube to carry fuel from the fuel tank to the carburetor of a motor mower. The design requires that the tube be flexible and transparent. List what you would think to be the design-limiting properties.

Exercise E1.8 A material is required as the magnet for a magnetic soap holder. Soap is mildly alkaline. List what you would judge to be the design-limiting properties.

Exercise E1.9 The cases in which most CDs are sold have an irritating way of cracking and breaking. Which design-limiting property has been neglected in selecting the material of which they are made?

Exercise E1.10 List three applications that, in your judgement, need high stiffness and low weight.

Exercise E1.11 List three applications that, in your judgement, need optical quality glass