

Student Feedback & Marking Report

Student: James Levi (2416761)

Module: ACMA4000 – Materials and Introduction to Processing

Assessment: Manufacturing Processes and Defects (Report 40% + Video 10%)

REPORT MARKING (40%)

1. Engagement with Literature Skills

Mark Awarded: 17 / 20

The report demonstrates strong engagement with a broad and appropriate range of sources, including academic textbooks (Callister & Rethwisch; Groover), peer-reviewed journal literature on PET sustainability (Tsironi et al., 2022), professional bodies (British Stainless Steel Association; Nickel Institute), and reputable technical and industry sources (Reuters Graphics; AZoM; Business Waste; Robinson Packaging). The literature is used to support claims regarding material composition (18/8 stainless steel), manufacturing routes (injection stretch blow moulding; glass blowing), mechanical and thermal properties, production rates, and environmental impacts. The sustainability discussion is grounded in multiple sources and reflects awareness of end-of-life challenges for PET and recyclability of metals and glass. This aligns well with the brief's requirement to evidence Tasks 1–5.

A minor limitation is that some web-based market and blog sources are used for production volumes and environmental claims without critical appraisal of assumptions or uncertainty. While appropriate at Level 4, synthesis across multiple sources into unified comparative statements could be stronger, particularly in the lifecycle and sustainability sections.

To enhance this criterion further, the student could synthesise findings from two or more lifecycle-focused sources into a concise comparative statement or table (e.g. indicative CO₂ footprint or recyclability rates per functional lifetime of cutlery, bottles and mugs). Overall, the literature engagement is strong and justifies a high mark.

2. Knowledge and Understanding Skills

Mark Awarded: 20 / 25

The submission demonstrates good technical understanding of materials, processes and properties. The student correctly explains the role of chromium and nickel in stainless steel cutlery and links corrosion resistance and ductility to suitability for repeated food contact and long service life. The PET bottle section accurately describes injection stretch blow moulding and links low density and toughness to transport durability and high-volume production. The glass mug section correctly outlines soda-lime glass composition, high-temperature forming and annealing, and links thermal and mechanical behaviour to performance in hot beverage applications. The mechanical and thermal properties table is broadly accurate and used to support comparative discussion.

The report shows awareness of process–property relationships, for example linking ductility to metal forming, thermoplastic behaviour to moulding, and glass brittleness to forming constraints. However, the structure–microstructure–property linkage could be made more explicit. For instance, the

microstructural basis of stainless steel's corrosion resistance (passive chromium oxide layer) and PET's viscoelastic behaviour could be explained more clearly. Some thermal property statements (e.g. glass conductivity and heat retention) could be more precisely linked to user safety and handling considerations.

To reach the highest band, the student should include short explanatory passages linking processing to microstructure and then to properties for each material class, supported by a simple schematic. Nonetheless, the level of technical understanding demonstrated is strong for Level 4.

3. Cognitive and Intellectual Skills

Mark Awarded: 15 / 20

The report demonstrates sound evaluative reasoning through comparison of original and alternative materials. The comparison of stainless steel cutlery with aluminium and plastic identifies trade-offs between durability, scratch resistance and weight. The PET bottle alternatives (glass and paper) are discussed in terms of recyclability, cost and transport implications. The comparison between glass mugs and ceramic alternatives appropriately weighs thermal insulation against brittleness and user safety. These sections show that the student understands material selection as a multi-criteria decision rather than a single-property choice.

However, the evaluation remains largely qualitative. Trade-offs are stated but not structured within a formal decision-making framework, and the environmental implications of alternatives are discussed without consistent quantitative metrics. The reasoning is appropriate but could be strengthened through more explicit prioritisation of criteria (e.g. performance versus sustainability versus cost) in design decisions.

To improve this criterion, the student could introduce a simple decision matrix ranking candidate materials against weighted criteria and briefly justify the weighting. This would demonstrate more explicit engineering judgement and strengthen the evaluative depth.

4. Practical Application Skills

Mark Awarded: 21 / 25

The application of materials and manufacturing theory to everyday products is a clear strength. The chosen objects are realistic and allow meaningful linkage between properties and service conditions, for example corrosion resistance and longevity for cutlery, lightweight durability for PET bottles in transport, and thermal stability and hygiene for glass mugs. Manufacturing processes are described in practical industrial terms, including production rates and energy intensity, and these are compared across materials in Table 1. The lifespan and cost analysis further contextualises material choice in real-world design constraints.

The practical application is strongly supported by multiple figures, process schematics and comparative tables, including manufacturing process diagrams for spoons, PET bottles and glass forming. In line with the marking approach, the extensive and relevant use of visuals justifies a

generous mark for this criterion. The visuals are generally well integrated into the narrative and support understanding of process complexity and throughput.

To further enhance this criterion, the student could add simple lifecycle flow diagrams explicitly showing raw material extraction, manufacturing, use and end-of-life pathways for each product. However, the existing level of practical application and visual support is strong.

5. Transferable Skills for Life and Professional Practice

Mark Awarded: 8 / 10

The report is professionally structured with a clear abstract, contents, lists of figures and tables, and well-organised sections aligned with the coursework tasks. Tables and figures are clearly labelled and referenced, and the writing style is coherent, technically appropriate and professionally presented. The inclusion of production rates, property tables and lifespan comparisons supports clear technical communication.

Minor improvements could be made in tightening phrasing and ensuring full consistency in formatting and referencing style. In a few instances, figures could be more explicitly interpreted in the main text to guide the reader's understanding of their relevance. Overall, the professional presentation and communication skills demonstrated are strong.

VIDEO PRESENTATION MARKING (10%)

Video file reviewed: Yes (MP4 submitted)

Video Technical Content and Communication

Mark Awarded: 7 / 10

The video clearly introduces the three products and accurately explains their materials, manufacturing processes and key mechanical and thermal differences. The delivery is clear and structured, reflecting the organisation of the written report. The student demonstrates good understanding of why each material–process combination is used and references sustainability and alternatives.

The video would benefit from stronger visual reinforcement. While products and processes are described verbally, the inclusion of simple on-screen process flow diagrams or a concise comparison table of properties or lifecycle impacts would strengthen clarity and technical communication. The concluding synthesis of trade-offs could be more explicit to demonstrate evaluative judgement.

To reach the highest band, the student should incorporate one or two clear on-screen diagrams and explicitly summarise engineering trade-offs between original and alternative materials.

Overall Summary

Report marks:

Engagement with Literature: 17/20

Knowledge and Understanding: 20/25

Cognitive and Intellectual Skills: 15/20

Practical Application: 21/25

Transferable Skills: 8/10

Video mark: 7/10