

ACMA5002 Coursework Feedback

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Selected topic/product/project: Injection-Moulded Smartphone Housing

Final mark: 78/100

1. Engagement with Literature Skills — 12/15

The report uses a good range of relevant engineering literature covering injection moulding, polymer materials, DFM, FEA and sustainability. Recognised sources such as Ashby, Boothroyd, Bayer design guidance, Goodship and Rosato are used to support technical principles including wall thickness, draft, fillets, mouldability and material recovery. Research is generally connected to the design and manufacturing decisions rather than presented only as background information. The material-selection and sustainability discussions are also supported by Granta data and relevant technical references. The literature review could be broader in its coverage of QFD, DFMEA, optimisation and cost modelling, and some claims would benefit from more recent peer-reviewed or standards-based evidence.

2. Knowledge and Understanding Skills — 24/30

The submission demonstrates very good understanding of injection moulding, DFM, polymer behaviour, material selection and high-volume manufacture. Relevant principles are applied through a nominal 2.5 mm wall thickness, draft, ribs, fillets, rounded openings and a single-piece housing that avoids unnecessary assembly operations. Material selection is well developed, comparing ABS, polycarbonate and TPU using strength, stiffness, impact performance, density, cost, embodied energy and carbon footprint before selecting ABS through a balanced justification. The report also demonstrates understanding of surface finish, dimensional stability, defect formation and manufacturing economics. Greater depth is needed in formal tolerance specification, inspection requirements and a clearly presented step-by-step manufacturing process plan.

3. Cognitive and Intellectual Skills — 23/30

A strong range of analytical tools is applied. The QFD provides quantified priorities for surface finish, impact resistance, wall-thickness consistency, strength, mass and cost. The detailed DFMEA identifies manufacturing and in-service risks, proposes corrective actions and records revised risk scores. Material alternatives are compared across mechanical, economic and environmental criteria, and the final choice is linked back to the QFD and DFMEA findings. A simplified DOE compares single- and dual-gate configurations using fill time, weld lines, sink marks and warpage, leading to a reasoned selection of the simpler single-gate arrangement. The analysis would be stronger with additional variables or design iterations, firmer acceptance criteria for the 0.442 mm warpage and more critical treatment of the highly conservative FEA results.

4. Practical Application Skills — 12/15

The report demonstrates very good use of Fusion 360, Granta EduPack and engineering calculations. The CAD evidence includes a detailed multi-view drawing with dimensions, external and internal views, functional openings, radii and manufacturing features. Two FEA load cases are documented, including applied loads, Von Mises stress, displacement and safety factors. The plastics analysis compares gate configurations, confirms complete filling, evaluates fill time and thermal distribution, and identifies weld lines, sink marks and warpage. Material mass and unit cost are also calculated, followed by manufacturing and break-even analysis. Further practical development would require mesh and constraint details, more representative drop or insertion modelling, explicit dimensional tolerances and a revised simulation demonstrating further reduction of the identified warpage.

5. Transferable Skills for Life and Professional Practice — 7/10

The report is comprehensive and logically structured, with an abstract, contents page, lists of figures and tables, numbered sections, technical drawings, simulation evidence, calculations, discussion, conclusion and bibliography. The document follows a clear progression from requirements through risk analysis, materials, design, simulation, cost and sustainability. Tables and figures are generally labelled and integrated into the surrounding discussion. The submission communicates the design reasoning and trade-offs clearly. Presentation is reduced by incorrect page numbering in parts of the contents, some difficult-to-read tables, frequent grammatical and wording errors, and handwritten cost calculations that are less professional than the remainder of the report. More careful proofreading and clearer digital presentation of calculations would improve the final standard.

Mark summary

Assessment category	Maximum mark	Mark awarded
Engagement with Literature Skills	15	12
Knowledge and Understanding Skills	30	24
Cognitive and Intellectual Skills	30	23
Practical Application Skills	15	12
Transferable Skills for Life and Professional Practice	10	7
Total	100	78