

ACMA5002 Coursework Feedback

Student: Kelly Jenkins

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Selected topic/product/project: PC-ABS Mobile Phone Housing

Final mark: 89/100

1. Engagement with Literature Skills — 13/15

The report demonstrates strong and wide-ranging engagement with literature covering DFM, DFA, injection moulding, QFD, FMEA, DOE, FEA, material selection, costing and sustainability. Academic papers, professional organisations, industrial sources and Granta data are used to support decisions concerning wall thickness, cooling, gate design, material performance, recycling and production economics. Literature is regularly connected to the engineering analysis rather than being confined to a descriptive review, particularly when discussing thermal behaviour, recycled content and manufacturing trade-offs. The substantial reference base supports the technical scope of the work well. Some evidence relies on commercial websites, and several numerical acceptance limits and cost assumptions would benefit from stronger standards-based or peer-reviewed verification.

2. Knowledge and Understanding Skills — 27/30

The submission demonstrates excellent understanding of DFM, DFA, injection moulding, polymer behaviour, cooling, defect mechanisms and high-volume manufacturing. These principles are applied through a controlled 2.1 mm wall thickness, fillets, radii, snap-fit features, dimensional considerations and attention to gate position and thermal uniformity. Material selection is particularly extensive, using multiple Granta charts to compare density, strength, stiffness, hardness, elongation, price, energy demand, thermal expansion and service temperature before selecting PC-ABS. The work also demonstrates detailed understanding of shrinkage, injection pressure, clamping force, cooling time, production rate, tooling and sustainability. Greater precision is needed when claiming that approximately 2 mm warpage meets the earlier target of less than 0.5 mm, and a consolidated step-by-step manufacturing and inspection plan would strengthen the submission further.

3. Cognitive and Intellectual Skills — 27/30

The analytical process is comprehensive and well integrated. The QFD identifies cooling efficiency, wall-thickness uniformity, gate configuration and cycle time as major design drivers, while the FMEA contains initial and revised RPN values and links corrective actions to later design and simulation work. The appendices provide clear evidence of iterative development through initial, second and final plastics studies, with changes to gate positioning, wall consistency and thermal behaviour producing improved filling, temperature distribution, air-trap control, weld-line distribution and shrinkage consistency. Static, thermal and nonlinear analyses are interpreted together to identify snap-fit stress as the principal structural concern. The main limitation is that the iterative studies are not organised as a formal DOE with defined factors, levels and comparative numerical response tables. Some conclusions concerning dimensional acceptability are also stronger than the stated tolerance evidence supports.

4. Practical Application Skills — 14/15

The submission demonstrates excellent practical use of Fusion 360, Granta and engineering calculation methods. The CAD evidence includes multiple component views and a detailed technical drawing. Plastics analysis addresses fill confidence, fill time, injection pressure, flow-front temperature, ejection temperature, weld lines, air traps, sink marks, warpage, deflection and volumetric shrinkage. Initial and intermediate studies are retained in the appendices, providing unusually strong evidence of iterative simulation-led development.

The FEA work is also extensive, including static stress, thermal stress and nonlinear static analysis, with full reports documenting the models and results. Analytical calculations for mass, shrinkage, pressure, clamping force, cooling, snap-fit stress, heat transfer and production time further support the digital results. A higher mark would require implementation and re-analysis of the proposed snap-fit refinement and clearer demonstration that final dimensional targets were fully achieved.

5. Transferable Skills for Life and Professional Practice — 8/10

The report is comprehensive, professionally organised and supported by an abstract, contents pages, lists of figures and tables, numbered technical sections, detailed appendices, calculations, recommendations and references. The work communicates complex relationships between flow, cooling, stress, cost and sustainability clearly, and the use of full simulation reports provides strong traceability. The discussion demonstrates independent judgement by recognising remaining hot spots, snap-fit stresses, long cooling time and opportunities for conformal cooling and design refinement. Presentation is reduced slightly by several grammatical errors, inconsistent page-number conventions and occasional claims that require more cautious wording. The report would also benefit from concise summary tables comparing the three design iterations and the final design directly against every original performance target.

Mark summary

Assessment category	Maximum mark	Mark awarded
Engagement with Literature Skills	15	13
Knowledge and Understanding Skills	30	27
Cognitive and Intellectual Skills	30	27
Practical Application Skills	15	14
Transferable Skills for Life and Professional Practice	10	8
Total	100	89