

ACMA5002 Coursework Feedback

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Selected topic/product/project: Ether-Based TPU iPhone 16 Pro Max Case

Final mark: 92/100

1. Engagement with Literature Skills — 14/15

The report demonstrates excellent engagement with academic, industrial and standards-based literature covering DFM, DFA, injection moulding, QFD, FMEA, DOE, CAD, FEA, material selection, Lean manufacturing, costing and sustainability. Recognised sources including Boothroyd and Dewhurst, Ashby, Groover, Osswald and Menges, AIAG/VDA guidance and Apple accessory specifications are used throughout. Literature is applied directly to the design specification, material-property limits, tooling assumptions, failure controls, production planning and environmental decisions rather than being presented only as background theory. The reference base is extensive and generally well integrated. Minor improvement would come from more consistent verification of some commercial cost figures and clearer bibliographic details for a small number of web and standards sources.

2. Knowledge and Understanding Skills — 27/30

The submission demonstrates excellent understanding of polymer product design, injection moulding, DFM/DFA, tooling considerations, material behaviour and high-volume production. The design specification is unusually detailed, covering mechanical, physical, thermal, electrical, aesthetic, dimensional and manufacturing requirements. Material selection examines impact resistance, hardness, elongation, tear strength, thermal expansion, mouldability, environmental durability, cost and recyclability before selecting ether-based TPU. The single-material design is well justified against a more complex multi-material alternative. Preliminary four-cavity tooling calculations, mould-steel selection, shrinkage allowance and runner and sprue considerations add further technical depth. A higher mark would require a fully dimensioned engineering drawing and clearer documentation of draft, complete tolerance values and final quality-inspection requirements on the CAD design.

3. Cognitive and Intellectual Skills — 28/30

The analytical work is broad and logically connected. QFD translates customer expectations into detailed design and manufacturing targets, while the DFMEA identifies material, fit, protection and functional risks and the PFMEA extends this analysis across the proposed production flow. The DOE compares four gate arrangements and then considers melt temperature, mould temperature, pressure and fill time when selecting a single-gate configuration. FEA considers installation, removal, pocket compression and hard-surface corner impact, with loading estimates supported by static-force and work-energy calculations. Cost analysis includes production quantity, labour, equipment, tooling, unit cost, revenue, annual profitability and break-even. The main limitation is that the DOE and FEA evidence is not summarised through sufficiently clear numerical comparison tables showing stresses, displacements, safety factors and each moulding response. This makes some conclusions more difficult to verify independently.

4. Practical Application Skills — 14/15

The submission demonstrates very good practical application of Fusion 360, Granta EduPack and spreadsheet-style calculation methods. The CAD model includes the functional openings, retaining lip, raised camera protection and single-piece case geometry. Material selection is supported by numerous Granta charts addressing strength, density, thermal behaviour, price, impact performance, embodied energy and recyclability. Four moulding configurations are compared, and several FEA studies examine relevant

installation and service loading conditions. Tooling-volume, runner, shrinkage and production calculations provide additional manufacturing evidence. Practical achievement is limited slightly because the report does not clearly present a detailed engineering drawing, mesh information, complete boundary conditions or numerical FEA result tables. The simulation evidence also does not show a fully documented final plastics-results set covering every defect output and final acceptance value.

5. Transferable Skills for Life and Professional Practice — 9/10

The report is comprehensive, professionally organised and supported by an abstract, detailed contents pages, lists of figures and tables, clearly numbered sections, extensive technical tables, visual evidence, appendices and a full reference list. The work communicates the relationship between customer requirements, materials, product design, process planning, risk, economics and sustainability effectively. The use of a Value Stream Map and separate DFMEA and PFMEA demonstrates a professional systems-level approach extending beyond the product geometry alone. However, some sections are overly dense and devote substantial space to lists of target properties without always synthesising them concisely into final decisions. Several simulation figures contain text that is difficult to read, and the report would benefit from stronger summary tables, clearer cross-referencing and more concise final evaluation of achieved versus unachieved requirements.

Mark summary

Assessment category	Maximum mark	Mark awarded
Engagement with Literature Skills	15	14
Knowledge and Understanding Skills	30	27
Cognitive and Intellectual Skills	30	28
Practical Application Skills	15	14
Transferable Skills for Life and Professional Practice	10	9
Total	100	92