

# ACMA5002 Coursework Feedback

Student: Georgia Cox

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Selected topic/product/project: Injection-Moulded TPU Mobile Phone Case

Final mark: 85/100

## 1. Engagement with Literature Skills — 13/15

The report demonstrates extensive engagement with relevant literature covering DFM, injection moulding, simulation, QFD, FMEA, material selection, sustainability and product development. Sources are regularly integrated into the engineering discussion and used to support decisions concerning wall thickness, material flexibility, impact behaviour, recyclability and high-volume production. The material-selection methodology is supported by recognised engineering literature, while academic and industrial evidence informs the discussion of manufacturing defects and sustainability. Referencing is generally consistent, and the reference list supports the breadth of the project. A small number of commercial and general sources are used where stronger academic or standards-based evidence could have been selected, but the overall research base is very strong.

## 2. Knowledge and Understanding Skills — 26/30

The submission demonstrates excellent knowledge of DFM, injection moulding, polymer behaviour, material selection, defect formation and manufacturing economics. These principles are applied through uniform wall thickness, controlled radii, fillets, draft angles, functional openings and a geometry designed for controlled TPU deformation. Material selection is particularly strong, with defined constraints and objectives followed by multiple CES comparisons involving modulus, density, strength, elongation, service temperature and price. The report also demonstrates detailed understanding of sprue and runner sizing, multi-cavity production, dimensional accuracy, recyclability, energy efficiency and waste reduction. Minor limitations relate mainly to the simplified assumptions used in parts of the structural and moulding models rather than gaps in technical knowledge.

## 3. Cognitive and Intellectual Skills — 26/30

The report presents a highly developed analytical process linking customer needs, risk analysis, material selection, simulation, costing and final recommendations. QFD identifies key trade-offs between impact protection, wall thickness, weight, cost and cycle time, while FMEA findings are used to guide material and geometry decisions. Four plastics studies systematically compare gate configuration, fill time, pressure, flow-front temperature, shrinkage, warpage, weld lines and air traps. This provides clear optimisation evidence even though it is not presented as a formal statistical DOE. Simulation 4 is selected through a reasoned evaluation of competing outcomes rather than through a single favourable result. The work also evaluates limitations honestly, including warpage above the original target and the restricted representation of nonlinear TPU behaviour. A higher mark would require formal factor-level DOE treatment and experimental or physical validation.

## 4. Practical Application Skills — 13/15

The submission demonstrates excellent practical application of Fusion 360, CES/Granta and engineering calculation methods. Detailed CAD drawings and dimensions are included, and plastics simulations clearly show comparative performance across four configurations. The report evaluates complete filling, pressure, thermal behaviour, shrinkage, weld lines, air traps and warpage, with the results used to refine the final configuration. Sprue, runner, part-volume and four-cavity shot calculations extend the practical manufacturing evidence. FEA reports Von Mises stress, displacement, strain and safety factor, while also recognising that

the linear model does not fully represent flexible TPU behaviour. A clear manufacturing process plan is provided from material preparation through moulding, cooling, ejection and inspection. Further credit would require nonlinear FEA, physical drop testing or prototype validation.

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

The report is comprehensive, logically organised and presented in a professional technical format. It includes an abstract, detailed contents page, figure list, numbered sections, clearly labelled technical figures, calculations, discussion, recommendations and conclusion. The work communicates complex simulation comparisons effectively and demonstrates independent engineering judgement when discussing compromises between quality, pressure, cycle time, warpage, cost and sustainability. The manufacturing process flowchart and cost summary support accessibility and practical understanding. Some sections are dense, several figures contain small text, and occasional wording and formatting inconsistencies reduce readability. More concise synthesis and slightly clearer presentation of the final numerical results would improve the professional communication further.

### Mark summary

| Assessment category                                    | Maximum mark | Mark awarded |
|--------------------------------------------------------|--------------|--------------|
| Engagement with Literature Skills                      | 15           | 13           |
| Knowledge and Understanding Skills                     | 30           | 26           |
| Cognitive and Intellectual Skills                      | 30           | 26           |
| Practical Application Skills                           | 15           | 13           |
| Transferable Skills for Life and Professional Practice | 10           | 7            |
| Total                                                  | 100          | 85           |