

# ACMA5002 Coursework Feedback

Student: Connor Ward

Student ID: 2412295

Selected topic/product/project: Mobile Phone Housing Optimisation

Final mark: 81/100

## 1. Engagement with Literature Skills — 12/15

The report is informed by a strong range of recent and relevant sources covering DFMA, injection moulding, manufacturing defects, QFD, FMEA, DOE, FEA, sustainability and cost modelling. Literature is generally used to support design and process decisions rather than being included only as background description. The discussion of injection moulding defects, material selection, analytical tools and manufacturing economics is well referenced, and the final reference list contains a good mixture of journal articles, industrial sources and software data. Figures and externally informed technical data are normally acknowledged. Some sources are less directly relevant, including an extrusion-modelling paper used in relation to injection-moulding simulation, and several important assumptions rely on commercial websites. Greater use of standards and directly applicable peer-reviewed sources would support a higher mark.

## 2. Knowledge and Understanding Skills — 25/30

The submission demonstrates extensive and accurate understanding of DFM, DFA, injection moulding, defect mechanisms, material behaviour, high-volume production and manufacturing economics. These principles are applied directly to the design through the use of a single component, integrated retention features, 2 mm wall thickness, 1.5° draft angles, fillets and functional cut-outs. The Granta study considers mechanical, thermal, economic and environmental properties before comparing TPO, TPU and TPV and selecting TPO through a clear rationale. Additional calculations for component mass and clamping force demonstrate further manufacturing understanding. Sustainability is also considered through recyclability, embodied energy, material usage and waste reduction. The main limitation is the absence of the explicitly required step-by-step manufacturing process plan from material preparation through moulding and quality inspection. Tolerance and dimensional-accuracy discussion could also be developed beyond the drawing and warpage result.

## 3. Cognitive and Intellectual Skills — 24/30

The report demonstrates a strong and logical analytical process. The QFD translates customer requirements into weighted engineering priorities, while the FMEA identifies realistic failure modes, recommends actions and presents revised RPN values after mitigation. The DOE section contains fourteen comparative simulations examining geometry, melt and mould temperatures, gate location, fillets and draft angles. Results are compared using fill time, predicted defects and warpage, with Attempt 8 selected through a clear trade-off rather than simply choosing the lowest individual value. Plastics and FEA results are interpreted and linked to design decisions, and the cost model clearly shows material, labour, equipment, tooling and break-even calculations. Further development would require a more formal DOE arrangement, clearer justification of the 50 N operational load, and a numerical cost comparison between alternative materials or manufacturing approaches rather than relying mainly on literature discussion.

## 4. Practical Application Skills — 12/15

The submission demonstrates very good use of Autodesk Fusion 360, Granta EduPack and numerical cost-analysis methods. The CAD model is clearly developed and includes functional openings, retention features, a camera surround, draft and fillets. A dimensioned engineering drawing and CAD-derived volume and surface-area data are included. Particularly strong practical evidence is provided through the repeated plastics simulations, which show how design and process changes were tested before the final configuration was

selected. The final simulation addresses filling, weld lines, air traps, sink marks, temperature and warpage, while FEA results are presented for five load levels with stress and safety-factor values. A higher mark would require fuller documentation of simulation settings, mesh quality, constraints, material models and loads, together with a more representative drop-test simulation and more complete dimensional tolerances on the engineering drawing.

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

The report is professionally structured and contains an abstract, detailed contents page, lists of figures and tables, numbered sections, technical tables, equations, recommendations and a clear conclusion. The progression from customer requirements to analytical tools, design development, simulation, cost and sustainability is coherent and easy to follow. Figures and tables are generally numbered, captioned and discussed in the text, and the final customer-requirement comparison provides a clear summary of the design outcome. The writing is mainly formal and technically appropriate, with effective communication of design decisions and trade-offs. Minor grammatical errors, occasional awkward wording and some small simulation images reduce clarity slightly. More consistent proofreading and clearer presentation of software outputs would strengthen an already professional report.

### Mark summary

| Assessment category                                    | Maximum mark | Mark awarded |
|--------------------------------------------------------|--------------|--------------|
| Engagement with Literature Skills                      | 15           | 12           |
| Knowledge and Understanding Skills                     | 30           | 25           |
| Cognitive and Intellectual Skills                      | 30           | 24           |
| Practical Application Skills                           | 15           | 12           |
| Transferable Skills for Life and Professional Practice | 10           | 8            |
| Total                                                  | 100          | 81           |