AAPL Tooling Requirements

1 Quotation

1.1 Initial Quotation

All quotations for AAPL business must be submitted to the designated Buyer and include, type of tooling, cost, delivery, lead-time, and quality guarantees. The tooling quotation format should be in the form of AAPL spreadsheet.

Lead Time

Part #	Part Name	Rev 3D	Rev 2D	No Of Cavity	Lead time (T1) weeks	Lead Time for Final FAI Ready Date (Parts to print) weeks	Lead Time for Final Cp./Cpk Ready Date weeks	Parts ready for AAPL Qualification weeks	Total lead time (Tool Ready for Shipment) weeks
7184-0000	**Former**	**A**	**A**	**4**	**8**	**2**	**1**	**1**	**12**

The tooling cost should be broken down if fitted with Hot Runner system:

- Tool Cost
- Hot Runner Cost, (include type & how many drops)
- Total Cost

The total quoted cost is inclusive of Tool Design, Manufacture of Tool, Texture & Polish, Fittings & Tool strap, Tool trials to achieve PPAP, Any molding materials required unless supplied by AAPL and samples delivered to AAPL for approval process. If the tooling requires any transfer this should be negotiated separately.
Any Toolmaker or Molder to be used for the manufacture of tooling or supply of components must be approved by AAPL prior to commencement of any project.

1.2 Terms & Conditions

Warranty Tool Life

1,000,000 shots (unless other wise agreed to by AAPL and Supplier)
Any on going maintenance, servicing & date code updates to be covered by suppler unless there is written agreement from AAPL

Payment Terms

30% upon order confirmation
30% upon submission of initial FAI, CpCpk, and samples
40% after parts are approved by AAPL & AAPL's customers
(Any other arrangements will require AAPL approval)

1.3 Engineering Changes

With any engineering changes required or requested suppliers are required to evaluate the effect on their previous commitments to AAPL in a timely manner after each engineering change issued after final data for tooling is released. Our goal is to have suppliers response sent to the designated buyer within 48 hours of the issuance of an engineering change. It is critical to have documentation for every new revision and a corresponding renewed commitment from suppliers on file even if there is no change in delivery, cost, warranty, or tool specifications.

The commitment should include, at a minimum, the same details in the table above under lead time (All new delivery dates where applicable), cost of the engineering change, isometric view and a description showing the engineering changes.

2.0 Start Tooling

2.1 Project management

AAPL expect suppliers to have project engineers assigned to all our projects and provide support for all tooling activities and engineering changes during all phases of the tool manufacturing and qualification process. Suppliers are expected to develop schedules, facilitate design reviews, coordinate tool tryouts, Submit inspection reports and PPAP. All schedules and status report are expected to be transmitted via email to AAPL Engineer & Buyer once every week.

AAPL expects suppliers to submit a list of contact names, detailed schedule and status reports within 7 days of AAPL confirming an order to the supplier.

2.2 DFM / DFA

AAPL expects suppliers to provide input on best practices regarding tool and part design for manufacture. Supplier should conduct a thorough review of part drawings, engineering specifications, CAD Data and evaluate the suitability of the part design to be tooled and the reliability of the tool to support tool life. In the event that the design of the part due to functional requirements create any potential quality or reliability issues to the tool, suppliers are expected issue these findings and any recommendations in a report back to AAPL

Where possible and for the more difficult and multi cavity tooling any support data like Moldflow analysis is recommended and should be submitted to AAPL for review before tool design is finalized.

3.0 General Tool Requirements

These are AAPL general tooling guide lines and should be followed unless prior approval has been given by AAPL

In any correspondence from Supplier to AAPL the following details should be included.

- AAPL part number
- AAPL part description (same as drawing)
- AAPL 2D or 3D data revision (CDDT No.)
- AAPL tool number

All AAPL tools should have an AAPL name plate (supplied by AAPL) fitted and engraved where possible, where tools are to small the following details should be engraved or stamped on a visible part of the tool. For PPAP a photo of the fitted plate or stamping details will be required.

- AAPL part number
- AAPL part description
- AAPL tool number
- Property of - - - - - - (if required)

All tooling quotes will be inclusive of all drawings, CAD files and tool designs which will remain the property AAPL & be included in the quoted cost. Purchase orders final payments will only be completed when final approval and PPAP has been accepted to the latest revision level of data so any discrepancies between 2D and 3D data need to be highlighted to AAPL as soon as they are found.

Tooling is to be designed to run in the most efficient machine size to achieve suitable cycle with enough cavities to satisfy order requirements and life of program. If unspecified tool life is 1,000,000 shots, parts should run automatically where possible and Hot Runners can be used but details must firstly be approved by AAPL.
Tool designs must be approved by AAPL before commencement of tooling with specifics such as, gating, ejector positions, inserts and cooling being detailed for approval.

Parts should be identified with:
- Cavity Numbers
- Material Code (>PP<)
- Date Code
- Part Number

If parts are too small for all these details some of this requirement can be left off with agreement from AAPL
All steel types & hardness for mold base, inserts & sliders should be detailed as part or tool design submission to AAPL
Tools should all be fitted with suitable lifting holes and mold strap to ensure mold doesn’t open in transit.

Supplier of components from Tools shall have a Tooling Management system in place which will be Audited at least once a year and will include:

- Maintenance & repair facilities with suitable personnel to support.
- Maintain tool records, including number of shot run, any maintenance & repairs detailed and logged.
- A copy of set up sheet for each machine the tool runs in.
- Suitable storage for all AAPL tools (color coding is recommended)

4.0 Mold Base

All mold bases need to be of a suitable quality to support the project life they are designed for (DME or equivalent for example)

Guide pins and bushes should all be hardened and ground with one pin off set so mold base has only one way assembly.

Ejector plates must be guided by bushes with a spring return system.

Ejector pins should be enough to suitably remove part from tool with out distortion, avoid using pins smaller than 2mm where possible if required they should be the stepped type.

Water ways should be optimized to achieve the desired cycle time, isopipes and spiral bubblers can also be used.

All tools must have a form of interlock between the two mold halves for alignment purposes, 4 places where possible (can be purchased interlocks)

Pockets for inserts should have 2mm radius in the bottom of the pocket where possible to prevent molds cracking. Where possible pocket inserts should be fitted with wedge blocks for ease of removal.

Inserts should be fitted where details of the design require, clip details and hole are a good example. These inserts must be marked and made in a way that they are not interchangeable with other similar inserts (use keys)

Any Hot Runner system should be approved by AAPL and have service and support (especially elements & thermocouples) in the region where the tooling will run production.

Grain will be required on some tools but cannot be added to the tooling until AAPL have had Graining Approval from their customers. Graining will also need to be provided by an approved source. (Moldtech for example)

5.0 Part Qualification

Parts qualification will consist of the following and should be sent to AAPL

- FOS (First off samples) T0 tests the tool
- FAI (Fist Article Inspection)
- Capability Studies on critical dimensions (Cp. Cpk.) 30 Shots Minimum T1
- Process set up sheets for each tool in Molding Machine
- Supplier report for trial

Suppliers will send samples (20 shots) from FOS (T0) if parts can run automatically without mold release spray and include FAI. If trial can only produce a few parts because tool requires adjustment or polish send only 5-10 sample without FAI.
Submission samples (20 shots) should then be submitted from T1 trial with FAI
After review & testing by AAPL any adjustments required are to be agreed upon & completed then supplier is required to submit PPAP
On approval of components & tooling a final copy of tool design is to be sent to AAPL.
The “Production Tool & Process Qualification” form below is to be completed and signed by the supplier then sent to AAPL with final part submission.

IF IN DOUBT ASK.

PRODUCTION TOOL & PROCESS QUALIFICATION

Part Number	
Description	
Rev. as approved, 2D &3D.	2D = 3D =
Tool Number	
Supplier, Site	

1.3.1.1.1.1

1.3.1.1.1.2 Motivation

_____ New Tool

_____ Tool or Process Modification; Explain:

_____ Tool Transfer

Qualification Requirements

2 **Item**	2.1.1.1.1.1.1.1	2.1.1.1.1.1.2 Notes
Window Study	Yes	
Tool drawings & documents	Yes	
First Article Inspection Report	Yes	
Capability Studies (Cp/Cpk)	Yes	
Sample Parts (25 shots)	Yes	
Inspection Plan	Yes	
Gage R&R	Yes	
Tool Guarantee (Number of Cycles)	Yes	
Process and Setup Sheet(s)	Yes	

2.1.1.2 Comments

Signature of the toolmaker on this document certifies that all documents are accurate and the tool can be used consistently to produce parts in high volume production environment to AAPL engineering specifications.

2.1.1.2.1 Supplier Certification

Authorized Signature	Date
Title	

AAPL Qualification Approval

2.1.1.2.1.1.1.1.1 **Procurement Engineer**	Date
2.1.1.2.1.1.1.1.2 **Design Engineer**	Date