Tool Design Review List for Stamping and Fineblanking

To be covered at the preliminary tool design review and then again at the final tool design review. The IMMI Engineer and the IMMI Strategic Buyer are responsible for assuring that tool design reviews are conducted and that each item below is considered during the tool design review including the requirements document. The Supplier is responsible for participating as the tooling and processing expert. The IMMI Engineer is responsible for assuring that this document is signed off by all parties. If the tool design review is waived, all three parties must sign off, confirming agreement.

Part Number(s): _______________________
IMMI PO#: _________________________
Date of Tool Design Review: _____________________________
Preliminary / Final / Waived (circle all applicable)

IMMI Engineer:  _____________________________
print name

IMMI Strategic Buyer:   _____________________________
print name

Supplier Representative: _____________________________
print name

Tool Design Review Discussion Topics

Tooling and Production
1) See the list of requirements (ENG-0169).
2) A level 4 PPAP, including validation layout and capability studies, may be required annually. Characteristics to be checked include: KCs and dimensions with a statistical requirement. Data from the most recent in-process checks may be used.
3) Stamping Production:
   a) Planned production rate?
   b) Die protection on the press – what is planned?
   c) What is planned in the tool?
   d) Oiling points – what is planned?
   e) Sharpening – what is planned?
   f) In-Process inspection – what is planned?
   g) What will be the size of the unapproved buffer between approval inspections?
   h) How does the stamper assure that only conforming parts from the buffer get mixed in with approved production?
4) Are ball lock punches advisable? Could they be problematic?
5) What dimensions/tolerances appear to be the most likely to be troublesome when stamping? What is the BEST tool design to meet those dimensions/tolerances?
6) Interchangeable sections?
7) Bends related to other part features: Should certain features be created after the bend operation - cammed? Without camming, can the tolerances really be statistically capable held in a production environment?
8) Expected tool life - perpetual maintenance?
9) General function/design of tool.
10) Secondary operations?
11) Burrs – label each potential burr location and consider the following:
   a) What is acceptable and where?
   b) What is the favorable burr direction at each burr opportunity? What is the burr direction according to the tool design at each burr opportunity? How do these compare?
   c) Can each potential burr location be moved to a produce a more forgiving situation?
   d) Should they be noted on the part drawing and the acceptable burr stated?
12) Coins- what is desired?
13) Potential mismatch (cutoffs, etc.) - label each location and consider the following
   a) Are they shown and noted for easy reference on the tool drawing?
   b) Should they be noted on the part drawing and the acceptable mismatch stated?
   c) How much mismatch is allowed? Where?
   d) Is the location OK with respect to part function? Can cutoffs be located such that they are forgiving of burrs and mismatch?
   e) Spike burrs?
   f) Can the part design be changed slightly to help reduce the likelihood of a spike burr? If so, which do we prefer, do we want extra steel on the part or less steel on the part?
14) Drawings - issues/problems?
15) Part Design Intent to be discussed.
16) Cavity ID, PNs, and other IDs: desired? location?
17) Surface finish needs?
18) What part features are tooled into each section? Considering what part feature relationships are tightly tolerated or critical, what is the best way to progress the part?
19) Land and break - is there a preferred side for the land/break? Is there a need for a high percent of land at any location on the part? What is the general need for percent land?
20) What is the planned sharpening frequency? All cutting elements? Should some tool components be sharpened more often than others should be sharpened?
21) What about resurfacing of non-cutting tool components? How often? Where?
22) What steel is planned to be used for what components? Where are the high wear areas of the tool?
23) Looking at the tool drawings, are there any weak areas in the tool? Does any area "look" like it might break under the stress of stamping?

Other
24) Top three expected difficulties in tool manufacture - what can be done to improve the situation?
25) Top three expected difficulties in tool maintenance - what can be done to improve the situation?
26) Top three expected difficulties in running parts - what can be done to improve the situation?
27) IMMI procedures QA-33, QA-38, QA-51, PUR-02, or PUR-03.

Review of Part and Part Drawing
28) Default Tolerances: Block tolerances? Equation? \[ T = \text{tolerance} = +(A + B \times Z), \text{Z} = \text{feature size}, \text{Tmax} = 0.xx \text{mm.} \]
29) Review measurement methods: KCs, other dims.
30) Special fixturing /gaging for measurement of the parts.

PPAP Approval
31) It is the supplier's responsibility to prove to IMMI that the tooling is capable of consistently making parts that meet the applicable requirements.
32) How will measurements on the edge of a dimensional allowance be handled (drawing change or tool change)?
33) PPAP Submission (what is included and requirements):
   a) Level? What components if a level four?
   b) Warrant.

ENG-0171 (REV. 8-05)
c) A die strip.
e) Production capacity.
f) Any test results required on the drawing.
g) Certification for the material used to produce the samples. What is desired on the cert - UTS, YTS, Ef, HRB, % spheroidite, and grain size?
h) A copy of the purchase order used to purchase the raw material.
i) The plating certification - must include the plating thickness and must certify that the parts were baked according to the drawing requirements.
j) Total Number of Samples: 103 per cavity.
   i) Processing must be identical to that planned for production parts.
k) ISIR - 3 parts per cavity - all dims including basics and reference and all GDT tolerances.
l) Control Plan.
   i) Number of samples per cavity?
   ii) Frequency of checks?
   iii) What are the statistical requirements for in process checks?
   iv) What part features will be included?
m) Process FMEA.
n) Tool PM plan.
   i) Frequency of checking the strip positioning features (pilots/guides) to be sure they will still do their job?
   ii) Is the PM plan reactive or proactive?
o) Process Flow Diagram.
   i) Include running into an “unapproved” parts container prior to checks (buffer).
p) Capability Studies.
   i) 30 pieces?
   ii) Number of setups (tool settings)?
   iii) All key characteristics and as indicated on the drawing.
   iv) All KCs and others as indicated on drawing and those with a statistical requirement.
   v) Ppk >= 2.0 - Each cavity?
   vi) Cpm >= 0.63 - Each cavity?
   vii) What must be calculated: Ppk, Cpk, Pp, Cpm, sample SD, Cpm SD, average, range, max, min?
   viii) Appearance Requirements: surface finish, button marks.
   ix) Burr requirements.
q) What else needs to be included in the PPAP to help make this part DTS?

IMMI Engineer: _____________________________
signature

IMMI Strategic Buyer: _____________________________
signature

Supplier Representative: _____________________________
signature