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ENGINEERING PROCESS REVISIONS

One of the many attractive aspects of the PEI process is our ability to quickly handle product changes with a minimum amount of time and cost. Because of our 'No Tooling' capabilities, we can handle changes that may not be possible with other processes or might be too time consuming or costly for the customer to accept. By using the power of CAD/CAM technology, we are able to alter an enclosure's design, change the tool paths associated with those alterations, update the manufacturing process plan to match the changes, and produce a prototype or production quantity of parts within hours or days.

As with all of PEI's engineering activities, we require that full documentation be produced by PEI and accepted by the customer for any and all changes. Because of the complexity involved with our products and the human error that can occur, we do not accept verbal instructions for product revisions. This does not mean that we expect the customer to make a full set of CAD drawings, rather, we prefer that they mark up existing drawings when possible and send them to us for review. Once we understand the changes and how we can implement them, we will update the CAD files and submit those updates to the customer for final (written) approval.

Once final approval has been received by PEI, the engineer assigned will revise the CAM files and documents and release the job for a new prototype part to be built. As with a product's initial design, we prefer to make a prototype part and have the customer approve it before making production quantities. Our experience is that even the simplest changes can lead to unexpected results and the only thing worse than having a part that does not work is having 100 of them!

Finally, on the subject of implementing changes, there are some points regarding the implementation of revisions that should be kept in mind. To begin, while we would prefer some advance notice of the expected changes, we can and have been known to implement product modifications mid-stream in a production run. We have numerous examples where customers have asked us to make running changes for such things as relocating standoffs, enlarging a connector hole, or adding additional vent slots. If it can be done, we will do it and because it is one of the advantages of our process, we gladly accept changes as a part of our normal business activity. One thing we never want our customers to feel is intimidated or embarrassed to request a change to their part.

However, not all change requests are equal, meaning that some changes are minor and can be implemented in a under an hour while others may require a major change to the model and manufacturing tool paths, leading to a more lengthy turnaround. The major difference between the two extremes is based on whether the change affects the geometry of the part. By that, we are referring to the dimensions of the plastic panels and any reference planes. As an example, we can easily increase the size or location of a cut feature such as a connector opening. To add a speaker opening or extend the length of vent slots is also a minor change that will usually take under an hour to implement.

On the other hand, increasing the height of the enclosure any amount may require a great deal more time. Because of the type of revision in this case, the amount of dimensional change is not the issue. Whether the height increases 0.010" or 10.000" it will take the engineer the same amount of time to complete. The reason is due to how our enclosures are constructed and how features and components are referenced. All panels and features are referenced from datum planes that intersect at an X, Y, and Z

coordinate point. Once any of those associated planes are altered, all other planes and corresponding features have to be re-associated to the new datum. As such, the amount of time it takes to implement a simple height increase of 0.010" can take several hours or even days to complete.

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