

## Design for Manufacturability Guidelines – Sheetmetal

This is an example of DFM guidelines for sheetmetal fabrication.

### Bends

Bends should be toleranced plus or minus one-half degree at a location adjacent to the bends.  
For the ease of manufacturing, multiple bends on the same plane should occur in the same direction.  
Avoid large sheet metal parts with small bent flanges.  
In low carbon steel sheet metal, the minimum radius of a bend should be one-half the material thickness or 0.80 mm (0.03 inch), whichever is larger.

### Counterbores

The minimum distance between two counterbores is eight times the material thickness.  
The minimum distance from a counterbore to an edge is four times the material thickness.  
The minimum distance from a counterbore to a bend is four times the material thickness plus the bend radius.

### Countersinks

The maximum depth is 3.5 times the material thickness at an angle of the hardware.  
A minimum of 50% contact between the hardware and the countersink is required.  
The minimum distance between two countersinks is eight times the material thickness.  
The minimum distance from one countersink and an edge is four times the material thickness.  
The minimum distance from a countersink and a bend is four times the material thickness plus the bend radius.

### Curls

The minimum radius is two times the material thickness with an opening to a minimum of one material thickness.  
The minimum distance between a curl and the edge of a hole is the radius of the curl plus the material thickness.  
The minimum distance a curl should be from an internal bend is six times the material thickness plus the radius of the curl.  
The minimum distance a curl should be from an external bend is nine times the material thickness plus the radius of the curl.

### Dimples

The maximum diameter should be six times the material thickness, and a maximum depth of one-half the inside diameter.  
The minimum distance that a dimple should be from a hole is three times the material thickness plus the radius of the dimple.  
The minimum distance that a dimple should be from the edge is four times the material thickness plus the inside radius of the dimple.  
The minimum distance that a dimple should be from a bend is two times the material thickness plus the inside radius of the dimple plus the radius of the bend.  
The minimum distance between one dimple and another is four times the material thickness plus the inside radius of each dimple.

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# Design For Manufacturability Guidelines

**ML Morrison**



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