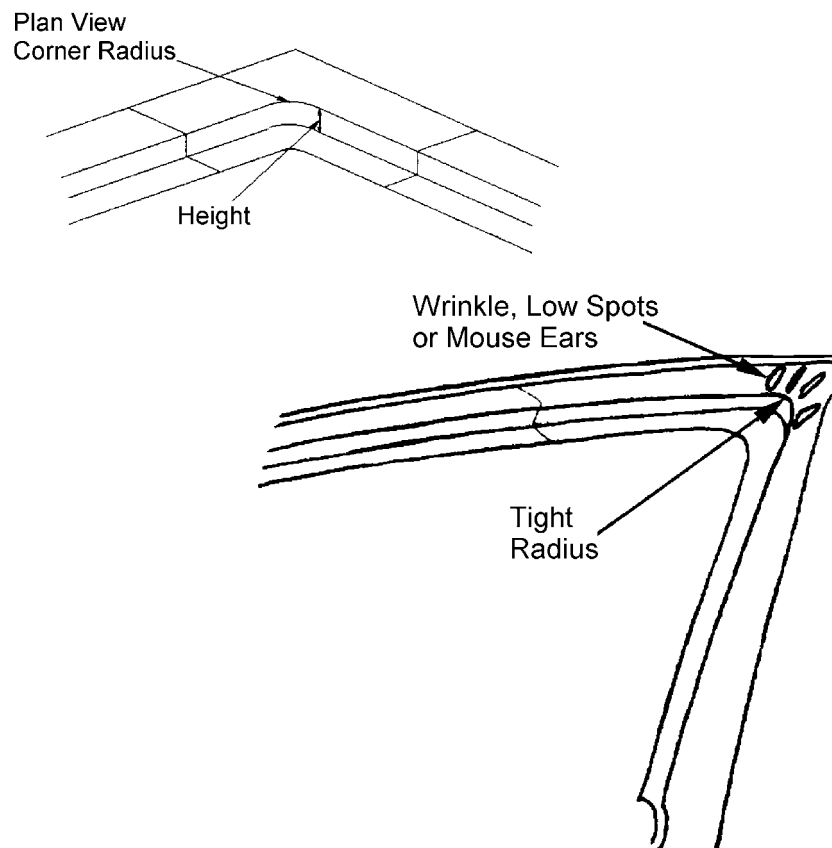


## Product Radii

Product geometry radii play a critical role in determining the severity and quality level of the final part in a drawing operation. A product with formable radii will facilitate a robust manufacturing process and a higher quality final product. The following are some of the concerns which result from drawing operations of products with "tight" radii:

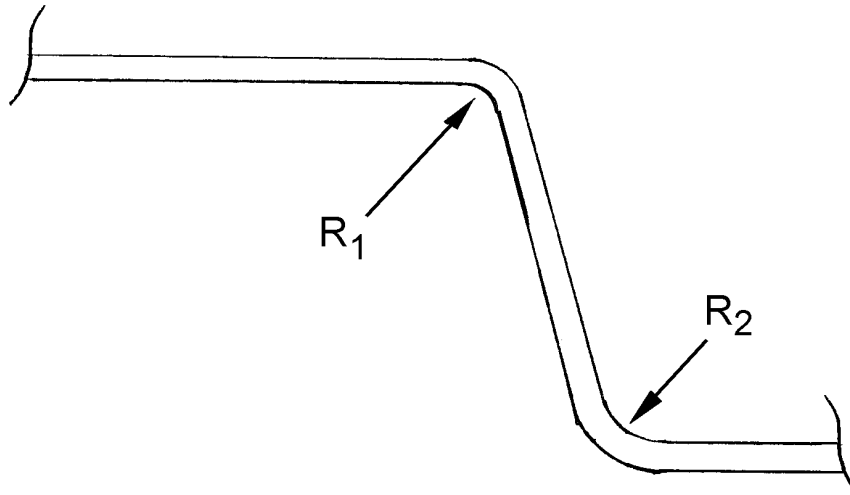
- Splits
- Wrinkles
- Low spots
- Extra die operations (restriking)
- Higher material grade (deep drawing quality)
- More tooling wear (more movement over radii)
- Higher die costs (coatings)



**Figure 1-5. Example of a Defect Caused by Tight Radii**

## Punch and Die Profile Guidelines for Drawing Operations

As general guidelines for product radii of drawing operations, the following can be used:



**Figure 1-6. Punch and Die Profile Radii**

When,	$R_1 \text{ \& } R_2 > 10 \text{ mm}$	The geometry is safe
When	$5 \text{ mm} < R_1 \text{ \& } R_2 < 10 \text{ mm}$	Tooling costs increase to manufacture product
When	$R_1 \text{ \& } R_2 < 5 \text{ mm}$	Tooling costs and quality penalties become too high and product changes are recommended