

Sheet Metal Design: Understanding Corner Relief Design Flexibility

Introduction

The enhanced Flange and Contour Flange commands in Autodesk® Inventor® software now enable selection of multiple edges and loops that result in a single flange feature. They also provide an option to automatically miter and create corner relief on adjacent flanges created using coplanar edges. Any change made to the Sheet Metal Style parameters such as miter gap or relief shape applies to all corners.

This new capability helps to streamline certain operations as well as simplifying the browser structure for the resulting parts. Consider the following example:

A polygonal face is created.

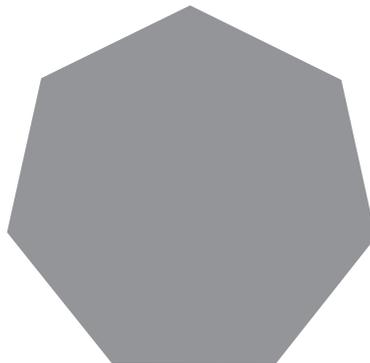


Figure 1

An open profile sketch is added to define a contour flange feature.

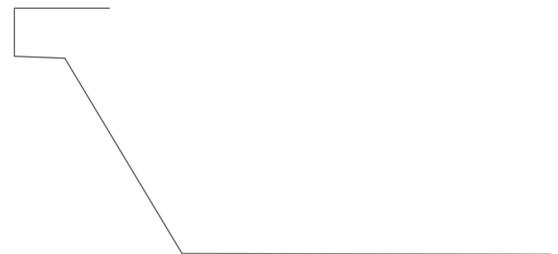


Figure 2

The contour flange is created using the auto-miter option, and the seven-edge loop of the polygon is selected. The resulting model faces are all nicely trimmed and all have appropriate corner relief in the flat pattern.

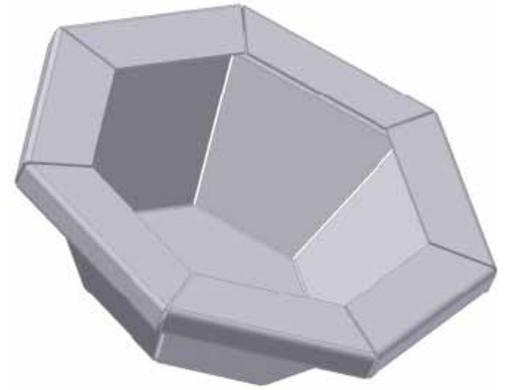


Figure 3

The browser for the preceding model shows two features:

- Face 1
- Contour Flange 1

The contour flange feature can be expanded to see the sketch, a bend, and a corner.

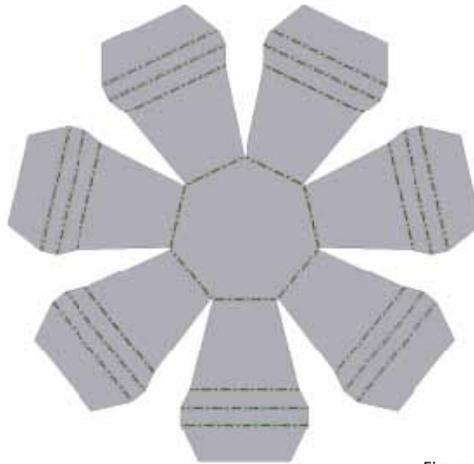


Figure 4

This behavior is fine if (as in the preceding example) you have a regular part and want all corners to be identical.

If your design requires different parameters for different corners, then it is essential to create them using the Corner Seam command after creating the flanges. To do so, it is important to turn off the automated mitering and set the corner relief to a “neutral” relief while creating the flanges.

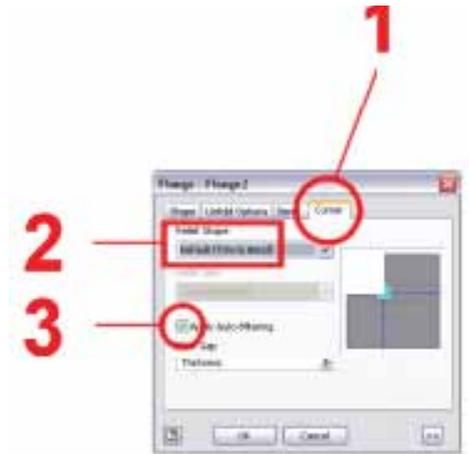


Figure 5

This is achieved on the Corner tab of the Flange and Contour Flange dialog boxes (1 in Figure 5 above) by setting Relief Shape to Trim to Bend (2) and clearing the Apply Auto-Mitering check box (3).

In the following example, an irregular face is created where specific treatments are required on each corner:

Note: This example sketch has no horizontal or vertical lines or 90-degree corners. Cases like this are more useful than simple rectangular faces in determining problems with the underlying algorithms.



Figure 6

A single flange feature is created along the five edges using a 40-degree bend angle, Apply Auto-Mitering is cleared, and the corner relief is set to Trim to Bend.

The preceding images show two views of the resulting model: viewed looking at the same face shown in Figure 6 (left) and slightly rotated (right).

At this point the folded model browser structure is similar to Figure 3. The browser shows two features:

- Face 1
- Flange 1

The flange feature can be expanded to display a bend and a corner.

Individual corner seam features can now be applied to the edge pairs in each of the five corners. This results in five additional features in the browser. The browser now contains the following browser nodes: seven first-level and two second-level features (child features of the flange):

- Face 1
- Flange 1
- Bend 1
- Corner1
- Corner2
- Corner3
- Corner4
- Corner5
- Corner6

A folded model with five unique corners might look similar to the following:

Each of the corners in the preceding illustration has a unique gap distance as well as different corner relief shapes.

Note: Attempts to create a corner seam feature over a corner that automatically resulted from a multiedge flange feature that had a relief type of anything other than Trim to Bend can yield unpredictable and often incorrect flat pattern results.



Figure 7

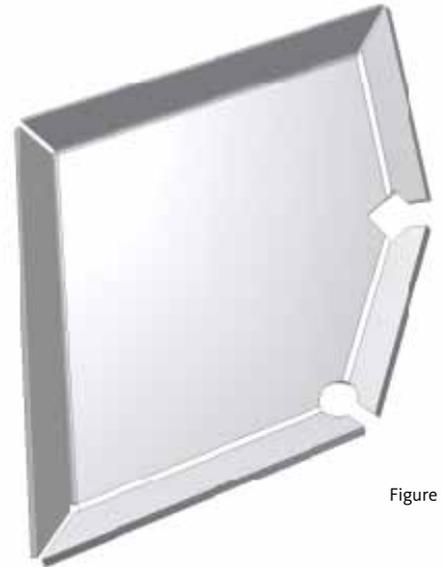


Figure 8