



UGS

*Transforming the
process of innovation*

Solid Edge V19

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Sheet Metal



What's New in v19?



- ▶ Better Manufacturing Documentation
 - ▶ Bend Tables in Part
 - ▶ Bend Table in Draft
 - ▶ Flat Pattern Cut Size
 - ▶ Divide Bend for Lofted Flanges (transitions)
 - ▶ Bend data to DXF
- ▶ Stiffer Models
 - ▶ Contour Flange on Curved Edges
 - ▶ Hem Command
 - ▶ Cross-Brake Feature
 - ▶ Gusset Command (Corner stiffener)
- ▶ Assembly Design
 - ▶ Flange Match Face



What's New in v19?



- ▶ General Fixes
 - ▶ Deliver Stencil Fonts
 - ▶ Enable thickness key-in for initial Contour and Lofted Flange
 - ▶ Dimension Constraints for Flange Profile
 - ▶ Unbend option for “All Bends”
 - ▶ Nearest Cut Normal Cutout (Welding Cases)
 - ▶ Contour Flange: Show Selected Edge in
 - ▶ Contour Flange: Apply Side During Contour Flange Edit
 - ▶ Contour Flange: Correct Miters for Outside
 - ▶ Contour Flange: Correct Miters for Interior Contour Flanges
 - ▶ Contour Flange: Optional Miters for large bend



What's New In Solid Edge v19



Better Tools for
Documenting the
Manufacturing
process

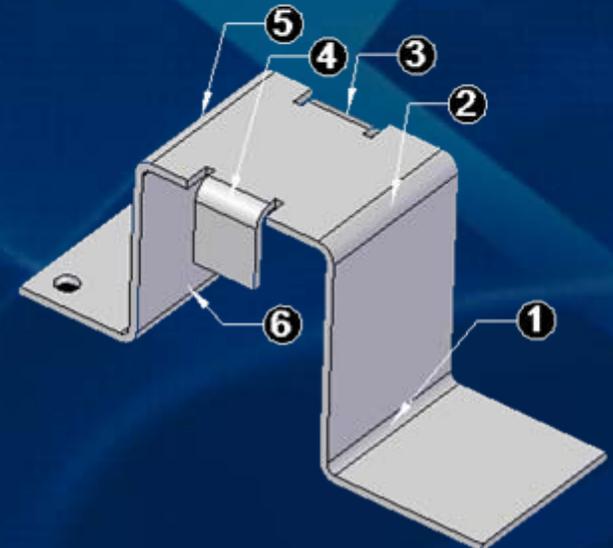


Bend Tables (Sheet Metal)



- ▶ A Bend Table option has been added to the Sheet Metal environment
 - ▶ User defined bend sequencing that is independent of the design tree
 - ▶ The Bend Table includes standard and custom data for each bend
 - ▶ Radius, Direction
 - ▶ Machine Die No.
 - ▶ The bend table can be accessed in a blank file so custom properties can be set in a template

Sequence	Feature	Radius	Angle	Direction
1	Flange 1	3.00 mm	90.00 °	Up
2	Flange 2	6.00 mm	90.00 °	Down
3	Flange 3	6.00 mm	90.00 °	Down
4	Flange 4	6.00 mm	90.00 °	Down
5	Flange 5	6.00 mm	90.00 °	Down
6	Flange 6	3.00 mm	90.00 °	Up





Bend Tables (Sheet Metal)



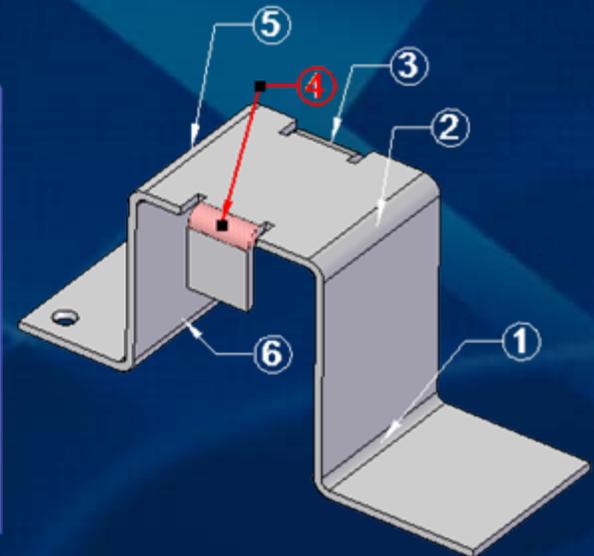
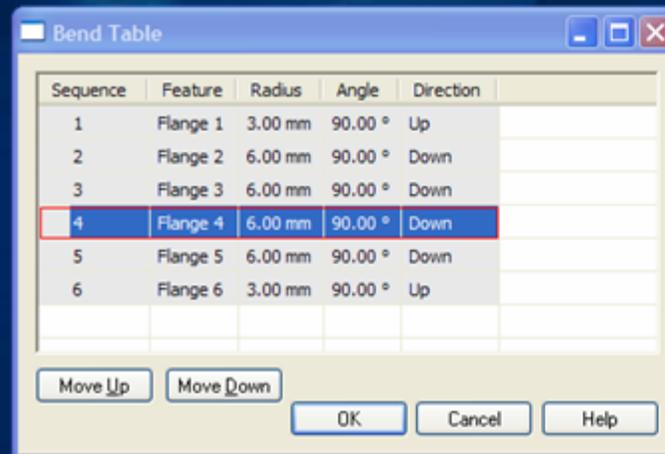
- ▶ For Family of Parts
 - ▶ The bend table is based on the current applied model
 - ▶ The Bend Table is copied to each member on create
 - ▶ Member Bend Tables are independent of the master file so they can be manipulated for that specific member.
- ▶ Established bend sequences will “survive” suppress and un-suppress states.
- ▶ Should the user delete a feature in the design tree, the bends are removed from the bend table and the sequence regenerated
- ▶ The “Direction” in the Bend Table is derived from the flat pattern model



Bend Tables (Sheet Metal)



- ▶ Sequence a bend by clicking Up / Down Arrows on the dialog
- ▶ Sequence a bend graphically by choosing the balloon and entering the desired sequence
- ▶ Selected bends graphically highlight



Yes is the answer to your next question



Bend Table in Draft



Bend Tables are available in Draft

Automatic Call-outs

Automatic Bend table

The technical drawing shows a bent plate with the following callouts: 1-90° 3, 2-90° 3, 3-90° 3, 4-90° 27.18, 5-90° 3, 6-90° 3, 7-90° 3, 8-90° 3, and 9-90° 3. A scale bar at the top right indicates 0 to 40.000 units.

Item	Sequence	Feature	Bend Rad	Bend An..	Dir...	Mach...	Tool...
1	1	Contour Flange 1	.03 in	90	Up	#432	Bulnose
2	2	Contour Flange 1	.03 in	90	Up	#120	Deep V
3	3	Contour Flange 1	.03 in	90	Down	#120	Std. V
4	4	Flange 1	.03 in	90	Up	#120	Std. V
5	5	Mirror 1	.03 in	90	Up	#120	Std. V
6	6	Bend 1	.03 in	90	Up	#120	Std. V
7	7	Contour Flange 1	.03 in	90	Up	#120	Std. V
8	8	Jog 1	.03 in	90	Down	#120	Std. V
9	9	Jog 1	.03 in	90	Up	#120	Std. V

DATE	REV	BY	APP

SOLID EDGE
v23.0 - THE PLM COMPANY

FILE: D:\PDS\WORK\1411...
DESCRIPTION: BENT PLATE
DATE: 04/11/07
Dwg: 1411-01
Sheet: 1 of 1

...in 5 clicks!



Bend Table in Draft



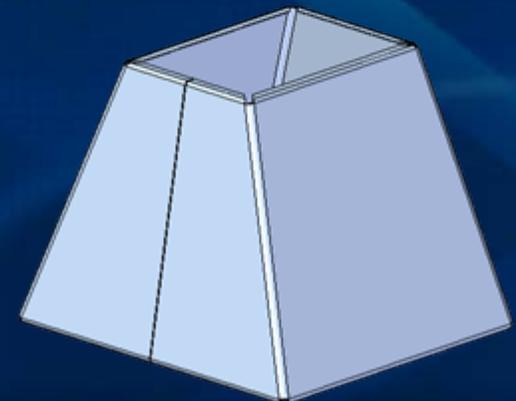
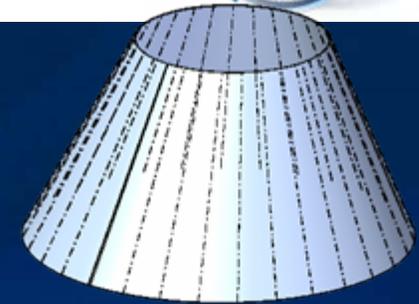
- ▶ Automatically (optionally) add a table in Draft that lists all bends of a selected flat pattern
- ▶ Automatically (optionally) add bend callouts to the flat pattern
- ▶ Callout options for “balloons” or embedded
- ▶ Configurable callouts (“Bend Up 90”, “90 UP, R0.03”, etc.
- ▶ Associative to the 3D model
- ▶ Sequence of bends listed as defined in the 3D model
- ▶ Bend direction no lists Up / Down, +/- can still be used.
- ▶ The format of the table is editable



Bend Centerlines Transitions



- ▶ Users can easily document the manufacture process for transitions
- ▶ Bend centerlines are added to the 3D model (and into Draft)
- ▶ Bend index marks are added to the DXF file to assist bending using straight press brakes
- ▶ Stock Templates delivered for
 - ▶ Round to Round
 - ▶ Round to Square
 - ▶ Square to Round

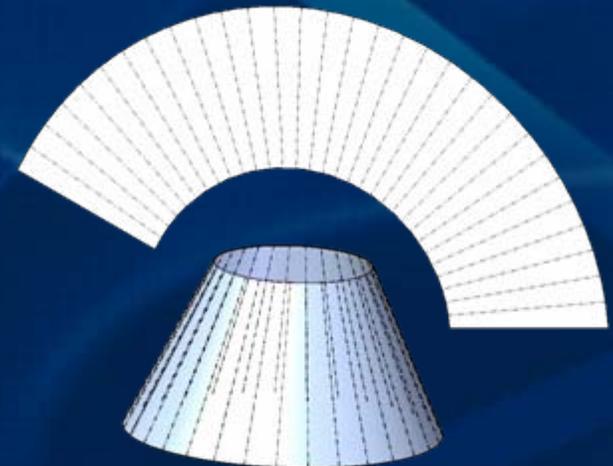
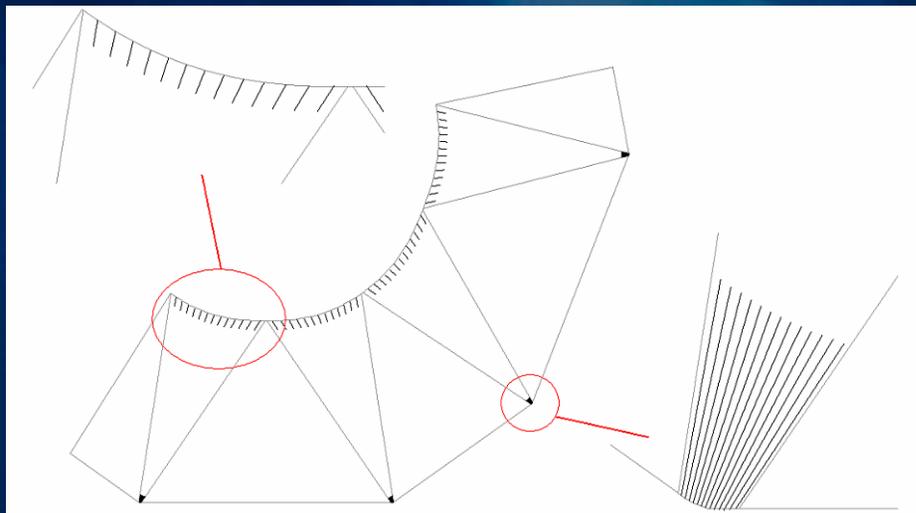
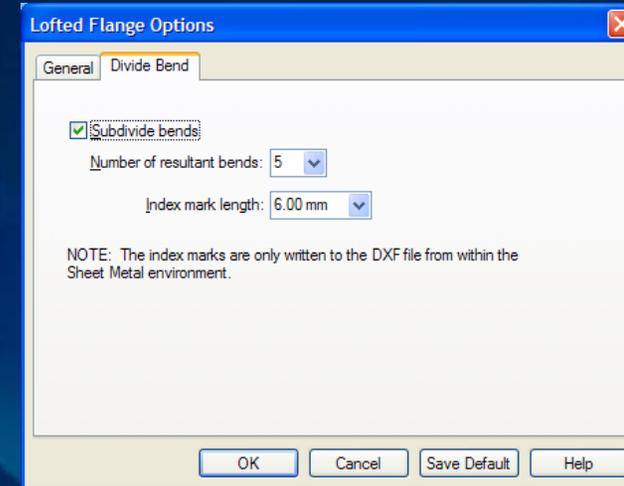




Divide Bend for Lofted Flanges



- ▶ Users can set the number of bends
- ▶ Users can set the index mark length
- ▶ Index marks are placed on a separate layer in the DXF file
 - ▶ Index marks are used to align the metal on the press brake

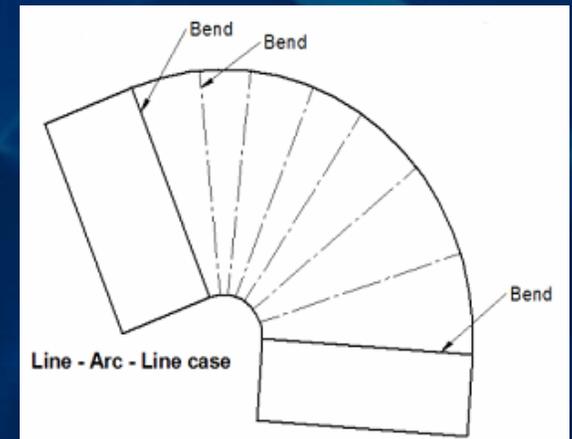
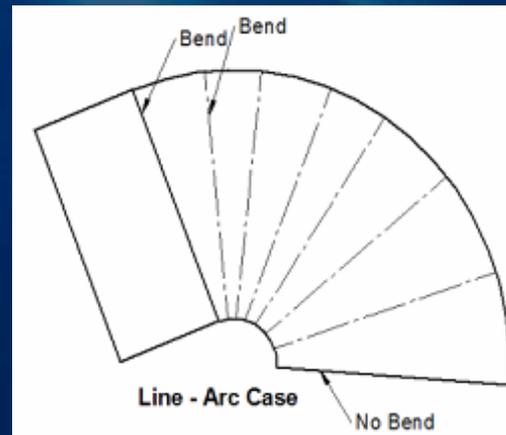
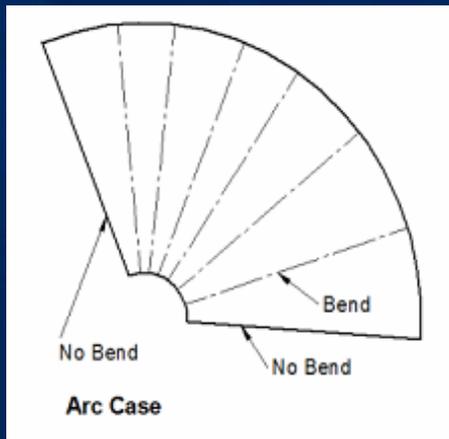




Divide Bend for Lofted Flanges



- ▶ Bend centerlines are placed at interior places on a lofted flange and at any end connected to adjacent flanges
 - ▶ Arcs only: only add bends to the interior & not at the ends
 - ▶ Arc line cases: add bends to the intersection of the line/arc and interior to arcs
 - ▶ Line arc line cases: add bends to the intersection of both the line/arc and interior to arcs

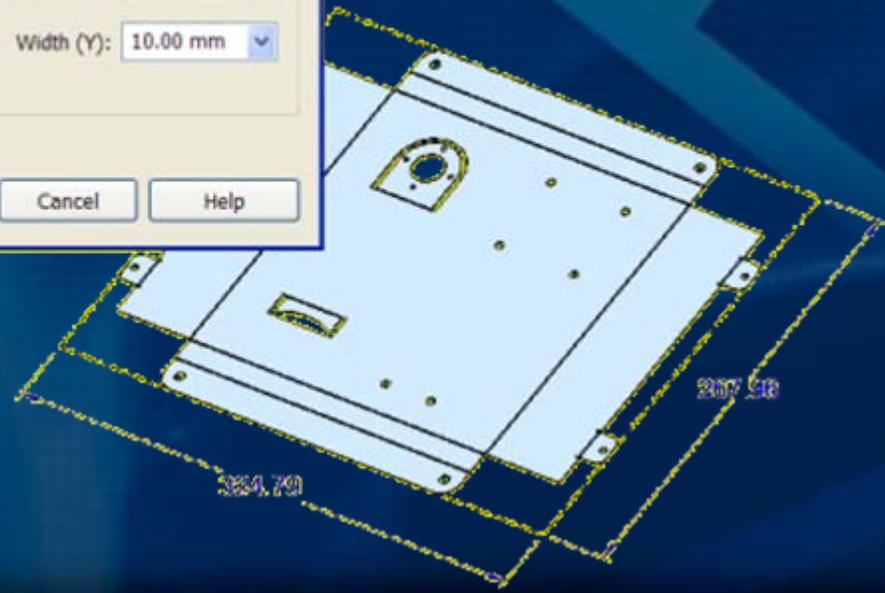
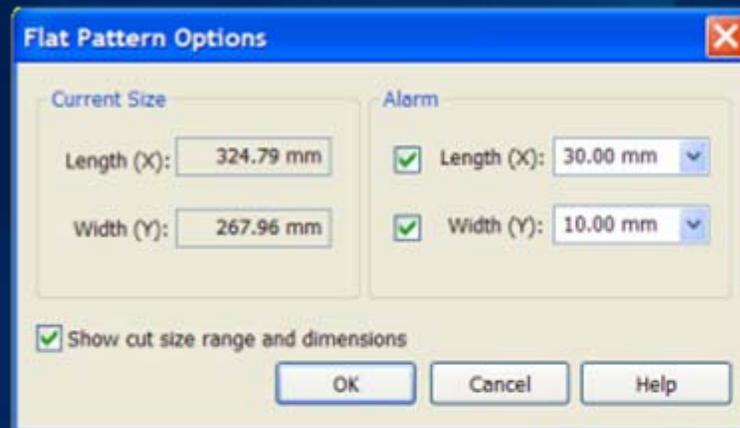




Flat Pattern Cut Size



- ▶ This command will automatically alert you when the flat pattern exceeds a specified blank size
- ▶ The cut size is dependent on the flat pattern so users have orientation control

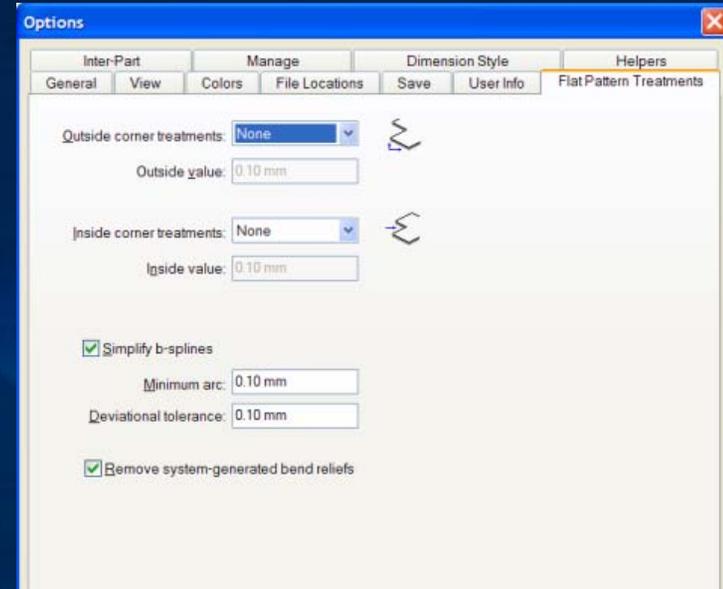




Flat Pattern Cut Size



- ▶ The blank size is a global setting listed in Tools | Options and can be established in a template file
- ▶ The size of the blank can be uniquely set
- ▶ The cut size dimensions are listed in the Variable Table (handy for expose variables)
- ▶ Users can quickly update the Flat pattern after a feature change and see the cut size



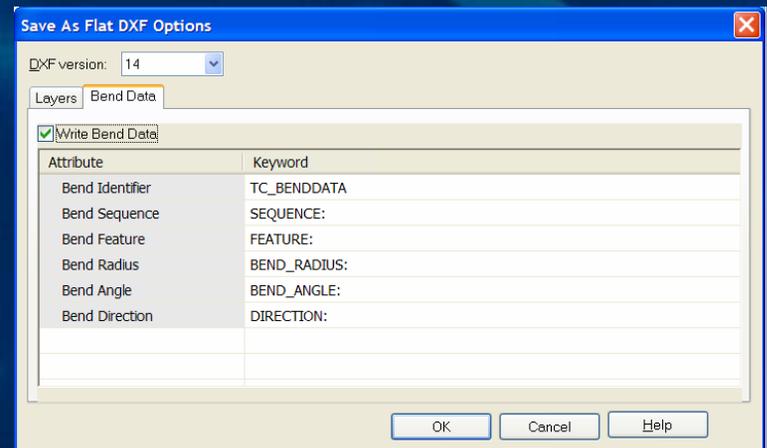
Type	Expose	Name	Value	Formula
Var	<input type="checkbox"/>	Flange_7_NeutralFactorGlobal	0.330	NeutralFac
Dim	<input type="checkbox"/>	Flange_7_Plane_FiniteAngle	90.00 °	
Var	<input type="checkbox"/>	Flange_7_RadiusGlobal	0.30 mm	BendRadi
Var	<input type="checkbox"/>	Flange_7_WidthGlobal	0.79 mm	ReliefWid
Dim	<input checked="" type="checkbox"/>	Flat_Pattern_Model_CutSizeX	324.79 mm	
Dim	<input checked="" type="checkbox"/>	Flat_Pattern_Model_CutSizeY	267.96 mm	
Var	<input type="checkbox"/>	Hole_1_Diameter	5.00 mm	
Dim	<input type="checkbox"/>	InsertBend_1_BendAngle	90.00 °	
Var	<input type="checkbox"/>	InsertBend_1_LengthGlobal	1.00 mm	ReliefLeng
Var	<input type="checkbox"/>	InsertBend_1_NeutralFactorGlobal	0.330	NeutraFac
Var	<input type="checkbox"/>	InsertBend_1_RadiusGlobal	0.30 mm	BendRadi



Bend Data to DXF



- ▶ Automatic bending machines now have all bend information for an improved manufacturing process
- ▶ Custom bend data such as bend direction, angle, radius, machine die#, etc. will be written to the DXF file for each bend
- ▶ The data and format is specific to bend software—out of the box will work for Trumpf





Quick Demo

- ▶ Bend Tables
- ▶ Flat Cut Size
- ▶ Transitions
- ▶ Bend Data To DXF



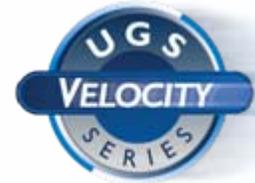
What's New In Solid Edge v19



Better Tools for
Creating Stronger Parts



Flange on Curved Edges



- ▶ A user can now create a Contour Flange on curved edges
- ▶ Typical uses are for creating weld flanges, safety edges, strengthening edges, etc.
- ▶ The edge can be a curved edge on a planar face or around a cylinder
- ▶ Model the way you need, but manufacture using common rolling mills

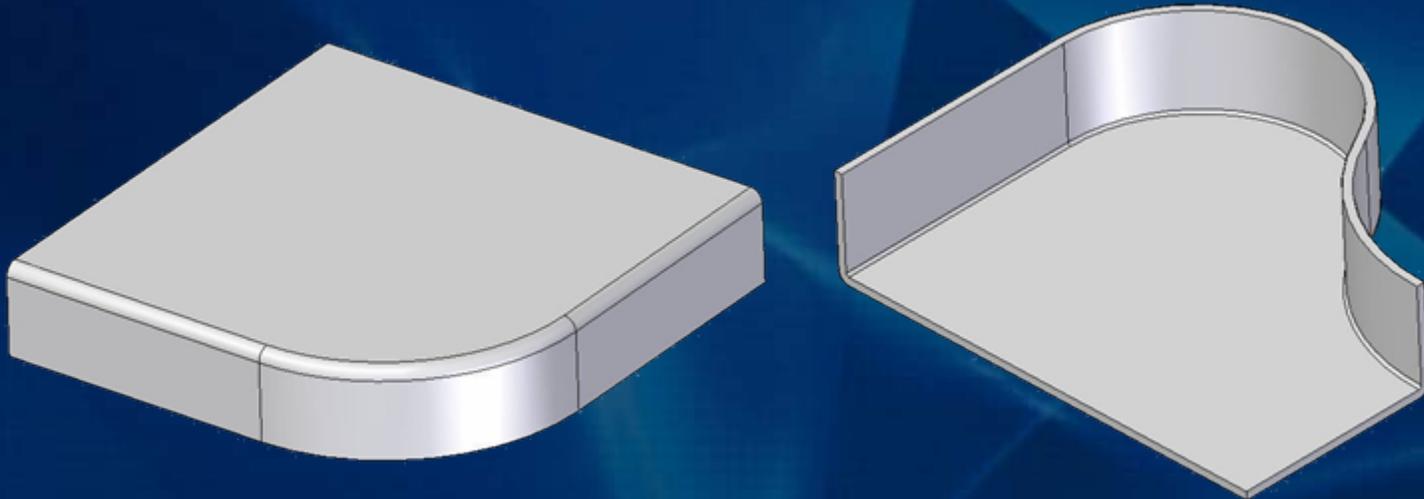




Flange on Curved Edges



- ▶ Users can also place a Contour Flange on curved edge of a tab
- ▶ The manufacturing process is typically some formed operation



Yes is the answer to your next question...

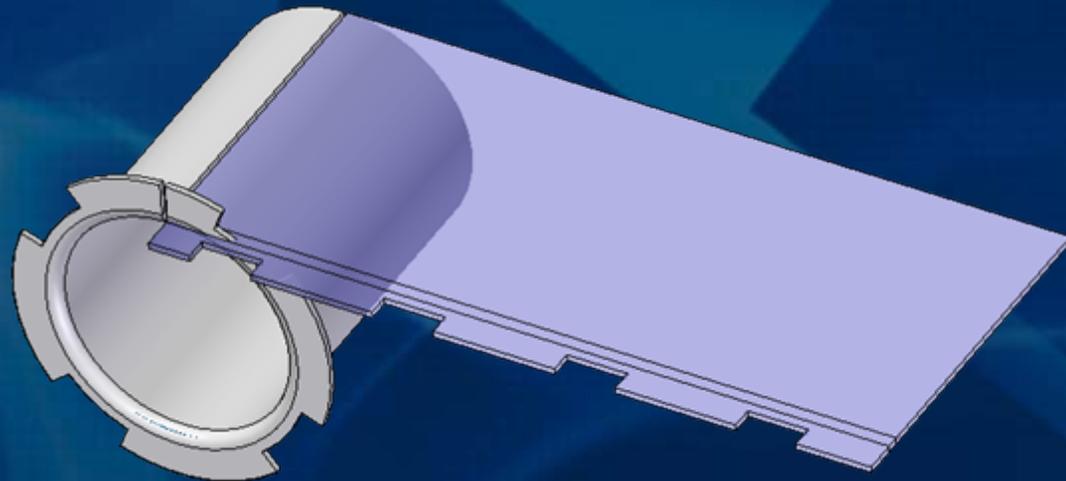


Flange on Curved Edges



Contour Flanges on curved edges will Flatten!

- ▶ The shapes for cutouts in the formed will be computed and be correct in the flat pattern and vice versa
 - ▶ A square cut in the formed will become a pie shape in the flat
 - ▶ A square in the flat will become a pie in the formed



Yes is the answer to your next question

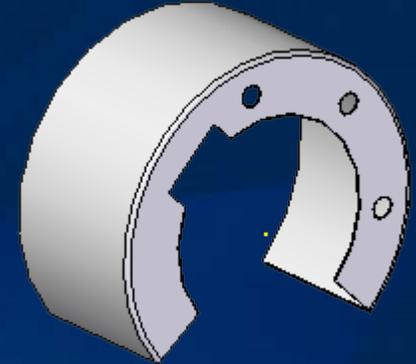


Flange on Curved Edges



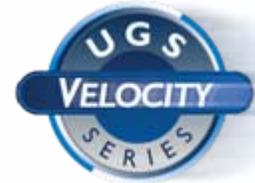
Holes in the formed model can be optionally preserved in the flat pattern!!!

- ▶ Pilot holes for mounting screws on a deformed flange will remain as holes in the flat.
- ▶ This option was added so you can easily manufacture the part, the hole on the rolled part will not be round, but in many cases that is acceptable
- ▶ See Tools | Options for the option

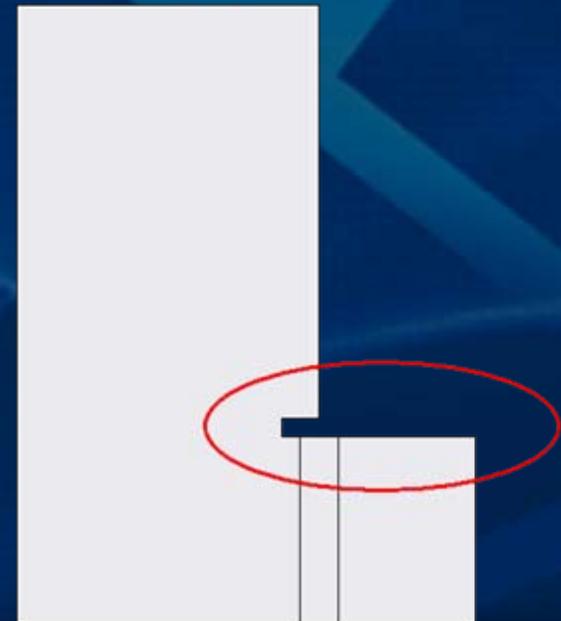
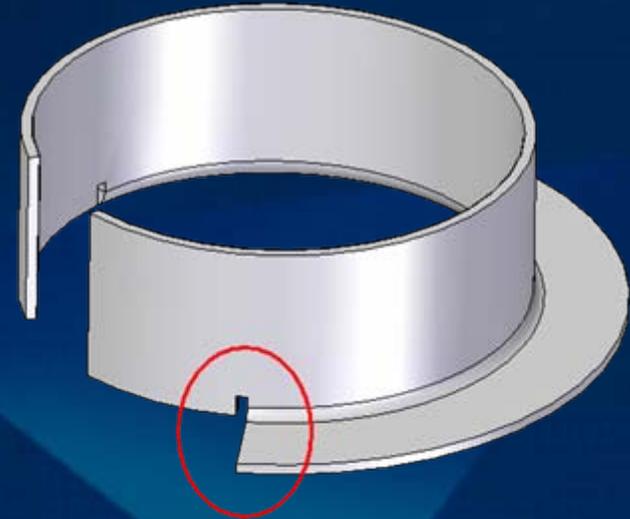




Flange on Curved Edges



- ▶ The dimension and geometry for relief on partial flanges will be preserved in the flat pattern
- ▶ Relief cuts generated in the flat pattern will be punch-friendly
- ▶ Bend relief sizes established in the formed state are preserved in the flat state
- ▶ Thinness faces are always perpendicular in the flat pattern

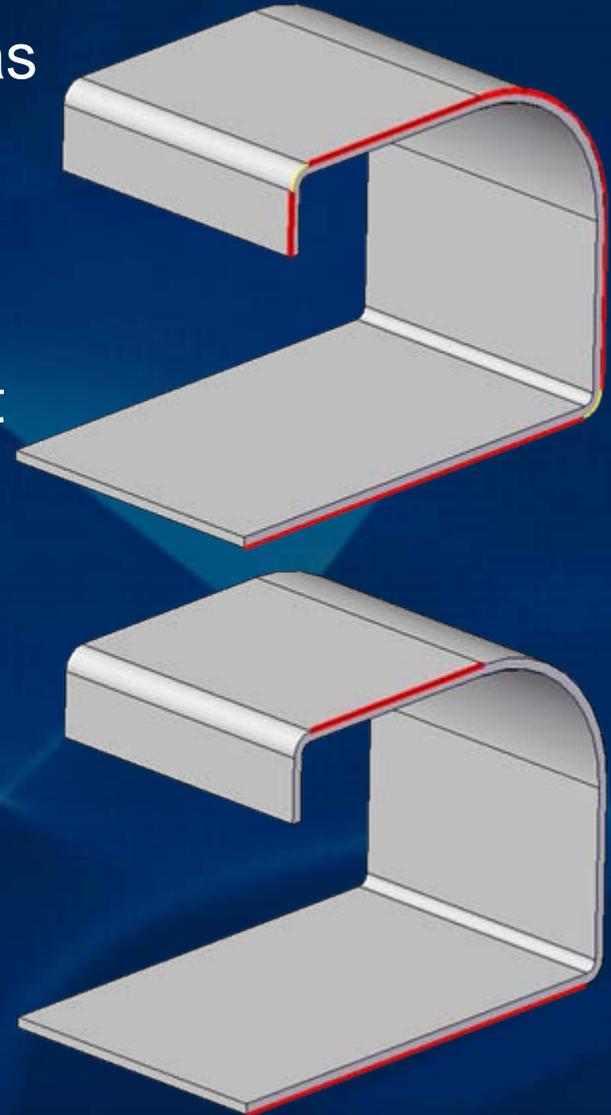




Flange on Curved Edges



- ▶ Locate / select / highlight behavior has changed, only highlighted geometry will be considered
- ▶ Chain will automatically locate and select all edges except for a bends at the default bend radius
 - ▶ Most cases, it's undesired to flange those bends
- ▶ Use Edge to select and deselect curved edges
- ▶ Any edge(s) along the chain can get selected

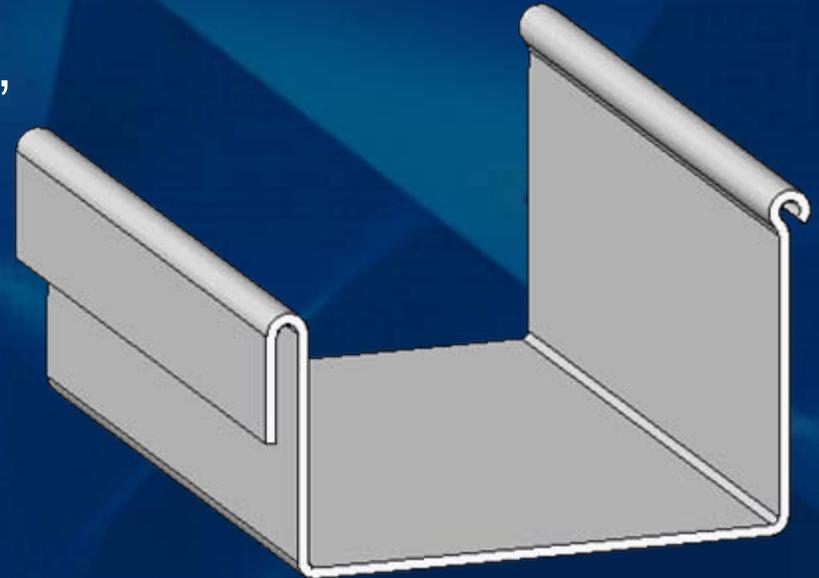




Hems



- ▶ Hems are now available for quickly and easily creating safety edges, hinge rolls, and other types of traditional edges.
- ▶ The Hem command supports 7 of the most common types
 - ▶ Closed, Open, S-Flange, Curl, Open Loop, Closed Loop, Centered loop
 - ▶ Use Contour Flange for more complex shapes
- ▶ Hems are edge treatments so just click an edge. Simple!



Yes is the answer to your next question



Hems



Hems can be applied to curved edges





Hems



- ▶ Support for saved so frequent sizes can be reused
- ▶ Automatic mitering around corners
- ▶ Options for bend relief
- ▶ Full support for material inside, material outside and bend outside
- ▶ The bends resulting from a Hem will be listed in the Bend table

Hem Options

Saved settings: [] Save Delete

Hem Profile

Hem type: [Curl] Bend radius 1: 1.50 mm
Closed Flange length 1: 15.00 mm
Open Bend radius 2: 1.50 mm
S-Flange Flange length 2: 15.00 mm
Curl Sweep angle: 270.00 *
Open Loop
Closed Loop
Centered Loop

Miter hem Angle: -45.00 *
 Bend relief

Square Depth: 3.00 mm Use default value*
 Round Width: 3.00 mm Use default value*
Neutral Factor: 0.330 Use default value*

*Default values are located in the Tools/Material Table/Gage dialog.

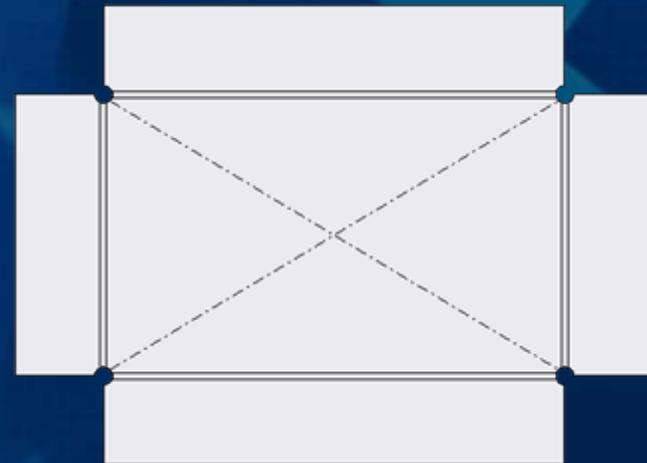
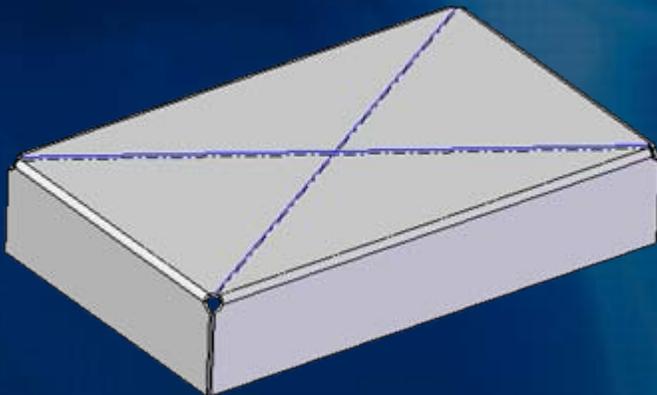
OK Cancel Save Default Help



Cross-Brake Feature

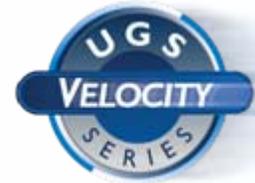


- ▶ The new Cross-Brake command allows users to add crossing bends to create an "X" set of bends typically used for stiffening large sheet metal panels
- ▶ The feature will only add attributes to the faces and not actually deform the 3D model. Virtually fail-proof!

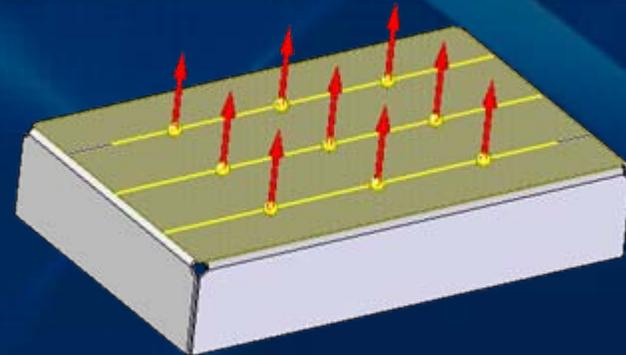
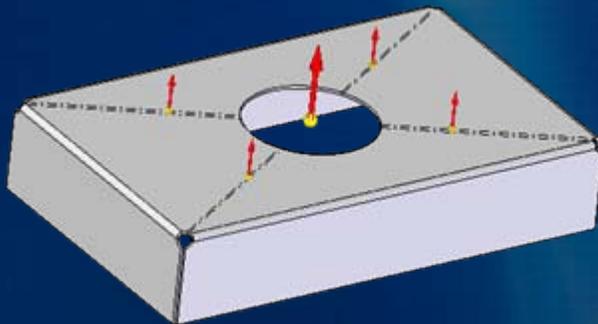




Cross-Brake Feature



- ▶ Each individual bend for the Cross Brake will participate in the Bend Table so you can document the exact order an “X” is to be bent
- ▶ Cross Brake features can participate in FOP and Feature Library
- ▶ The “bend” angle is listed in the variable table
- ▶ Multiple cross-brake features are allowed, but linear sketch elements only



Yes is the answer to your next question

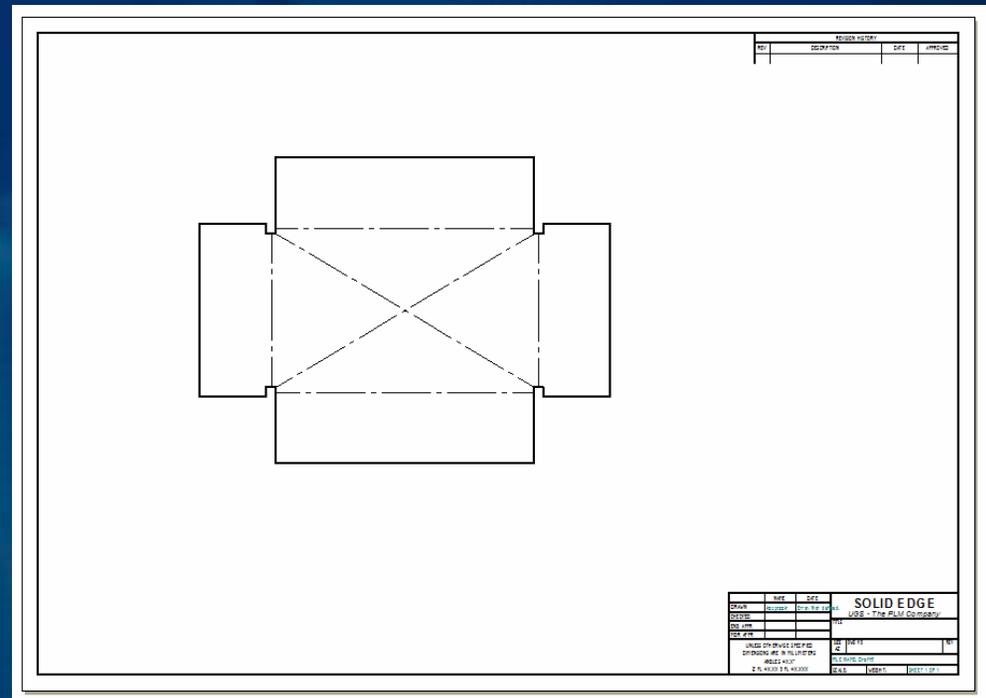
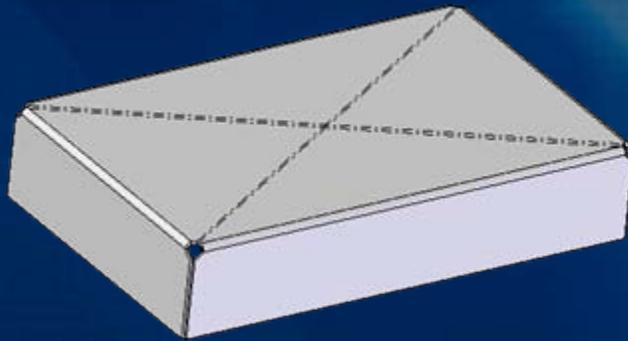


Cross-Brake Feature



Cross Brake features will propagate to the flat pattern in and can be documented in Draft (and export to DXF).

- ▶ Traditional centerline in full support of annotations and dimensions





Gussets



- ▶ You can now add stiffening ribs across bends (Gussets)
- ▶ Standard straight stamp Gusset or user defined profile that supports custom shapes
- ▶ Pattern Gussets while in the command
- ▶ Saved settings is available for building a library of specific types





Gusset Command



Gusset Options

Gusset Options

Saved settings: Save Delete

Gusset Profile

User-drawn profile

Automatic profile

Depth: 20.00 mm

Gusset Shape

Round

Square

Radius: 2.00 mm

Rounding

Include rounding

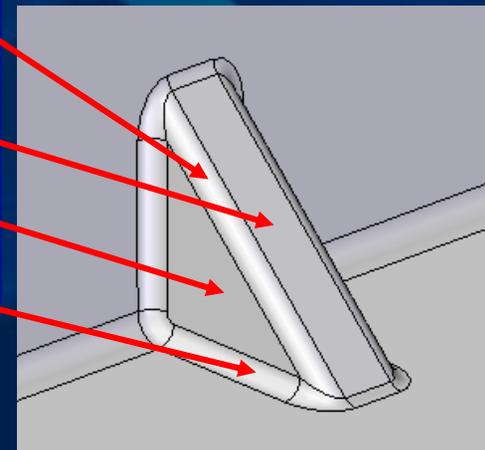
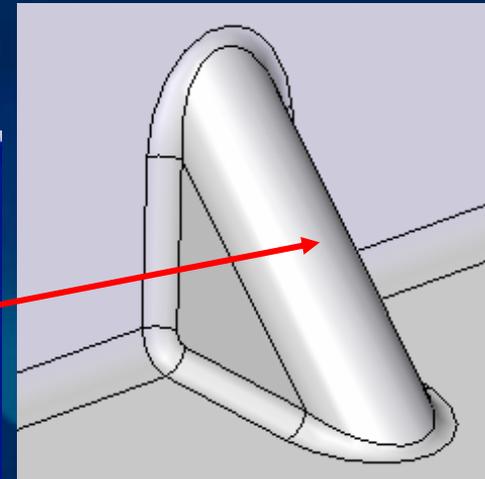
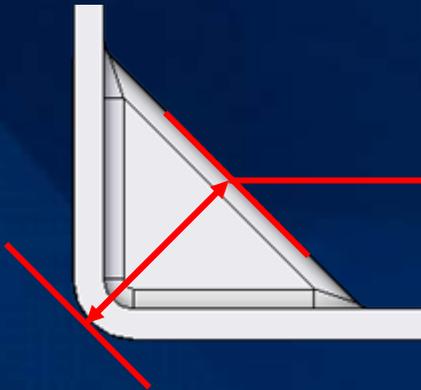
Punch radius: 1.00 mm

Die radius: 2.00 mm

Width: 10.00 mm

Taper angle: 5.00 °

OK Cancel Save As Default Help



Yes is the answer to your next question

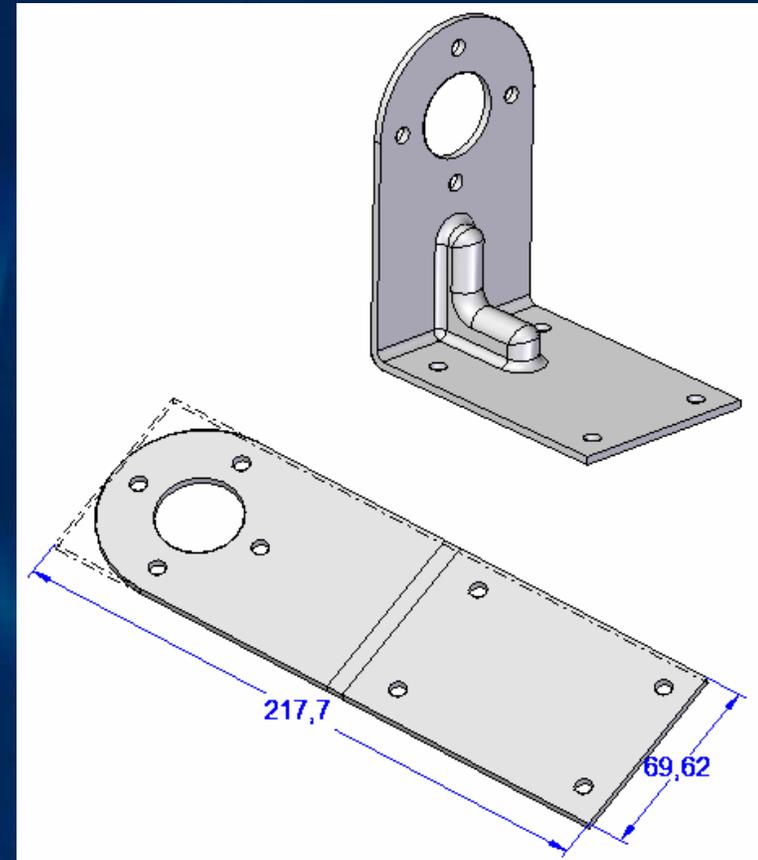


Gussets



Models with Gussets can be flattened

- ▶ Gussets are considered local deformation, thus the flat pattern will not be affected
- ▶ Gussets are post bend operations, so no information will be included in the flat pattern
- ▶ Users will document the locations of the Gussets on the formed model





Create Stiffer Parts



Quick Demo

- ▶ Flange on curved edges
- ▶ Hems
- ▶ Cross Brakes
- ▶ Gussets



What's New In Solid Edge v19



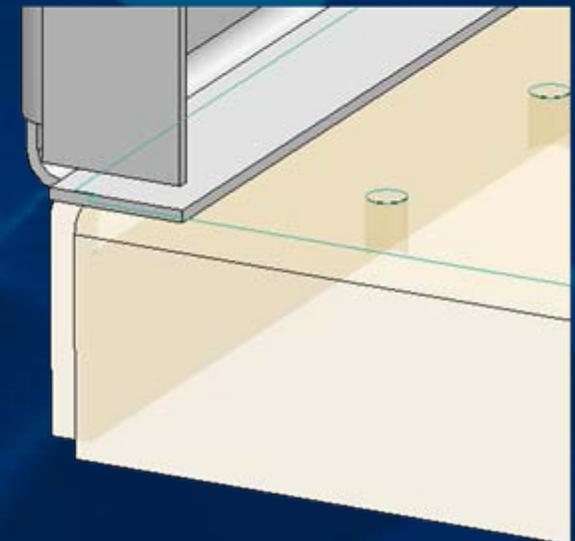
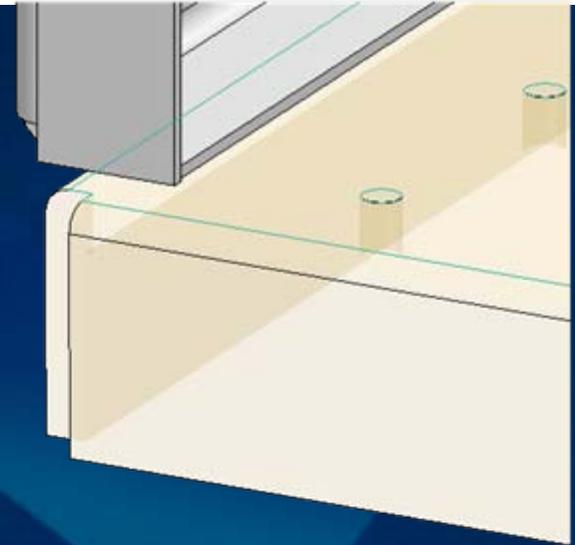
Better Assembly Design Tools



Assembly Design



- ▶ Users now have easy methods to make “this flange” match “that face”
- ▶ Perfect for in-context design where parts must fit together
- ▶ Works in conjunction with Inter Part Copy for full associativity
- ▶ Supports offsets from the target face
- ▶ The target face can be at any angle.



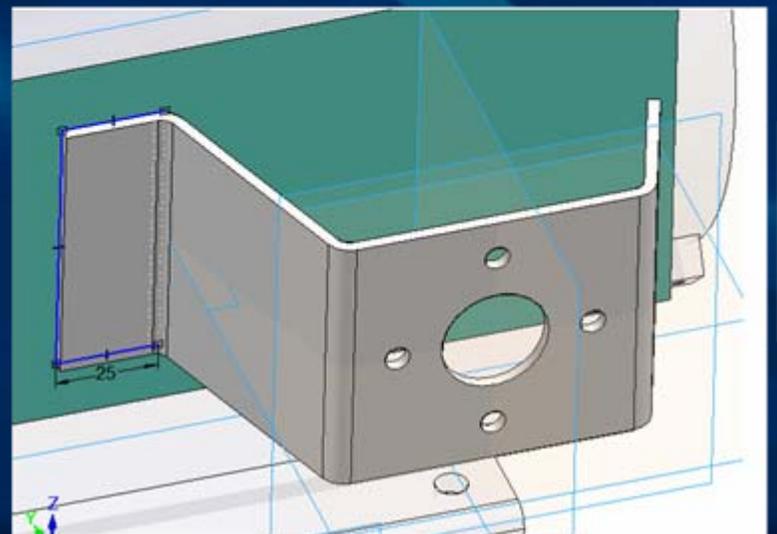
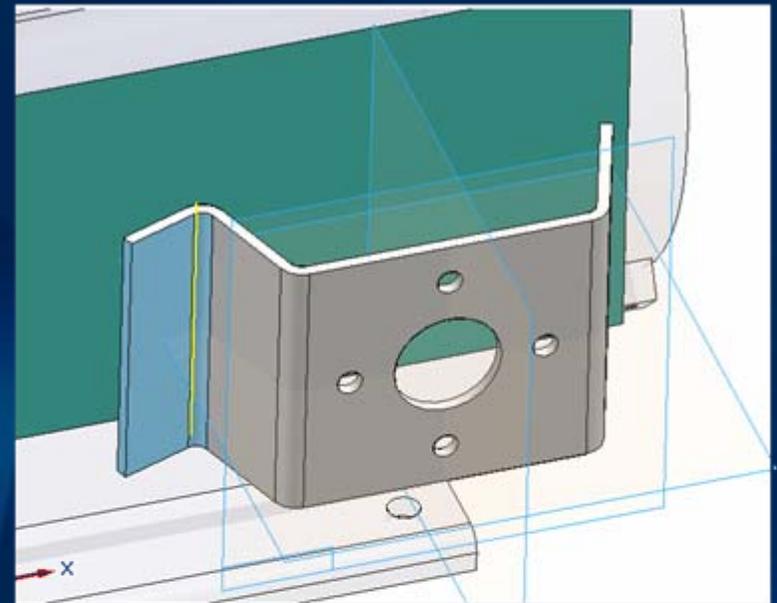


Assembly Design



- ▶ Available in the Flange command during the extent step
- ▶ Simply choose the target face and specify an offset
- ▶ The profile and plane is transformed to the target face to support profile edits

Yes is the answer to your next question

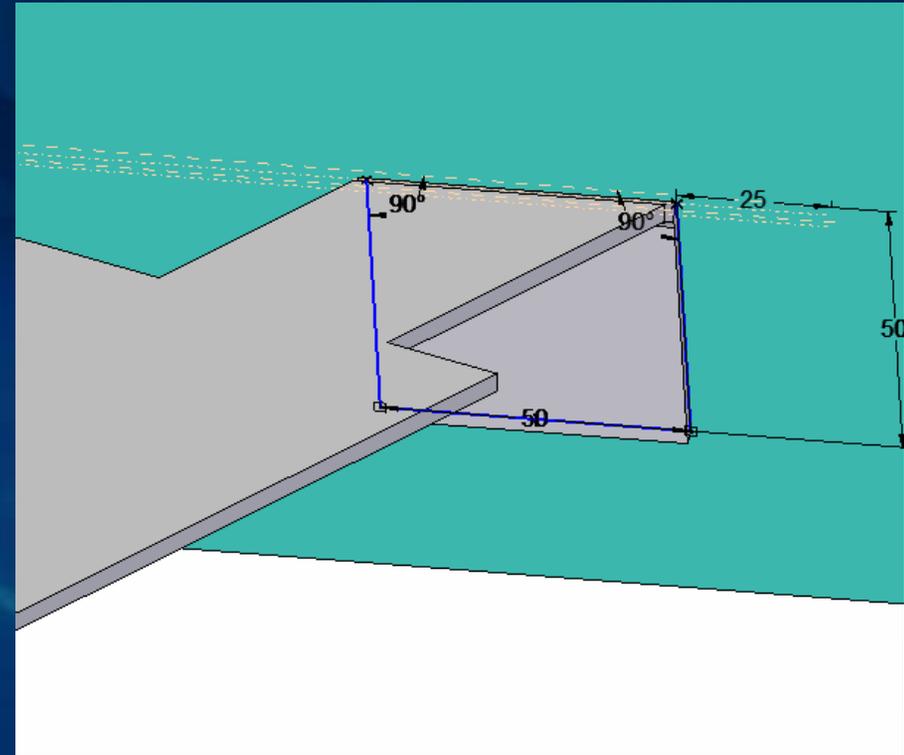




Assembly Design



- ▶ Faces at any angle can be matched (within geometric reason)
- ▶ The initial dimension scheme (inside / outside) will be maintained
- ▶ Works with any of the flange types (full, partial, centered, etc.)
- ▶ Support for offsetting from a face to provide some clearance



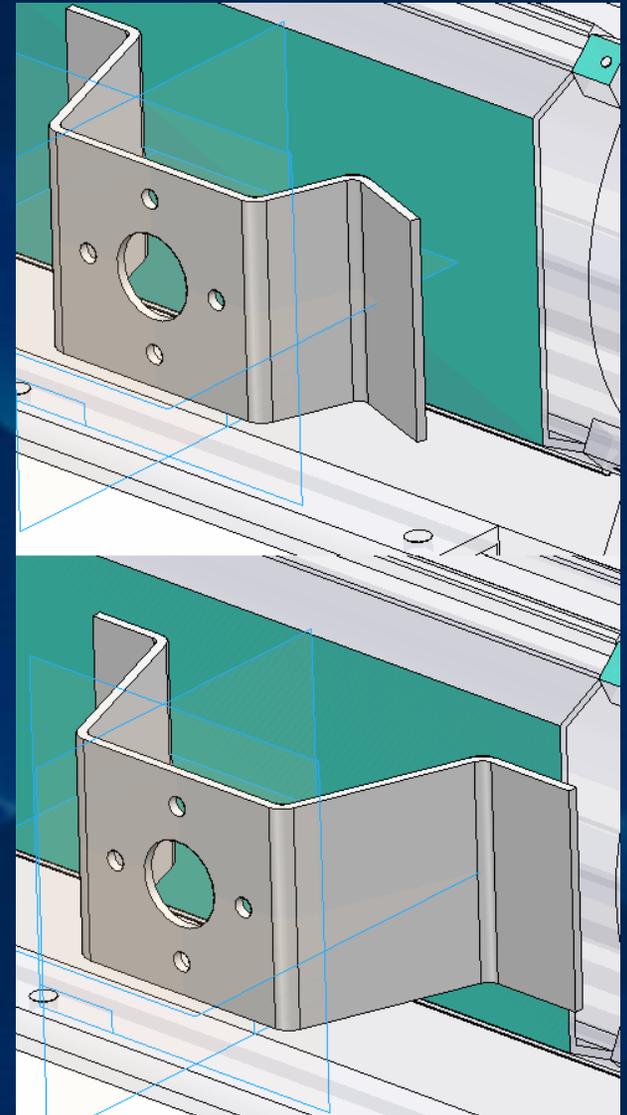


Assembly Design



Face matching can be used on imported geometry or outside the flange command

- ▶ Also available as separate command for Direct Editing
- ▶ Ideal for making the vendor part fit my part
- ▶ Works on most flanges (outer flanges only)





Quick Demo

- ▶ Flange: Match Face
- ▶ Direct Edit: Match Face



What's New In Solid Edge v19



General Command Enhancements



Deliver Stencil Fonts



- ▶ Stencil fonts are being delivered and can be used for creating text on sheet metal parts
- ▶ Full support for size, italics, and bold

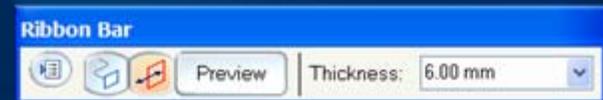
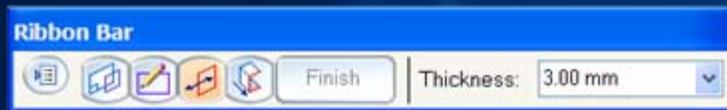




Base Feature Thickness Entry



- ▶ Contour Flange and Lofted Flange
 - ▶ During the side step, you can enter the default material thickness
 - ▶ Available for the base feature only
 - ▶ Available during edit

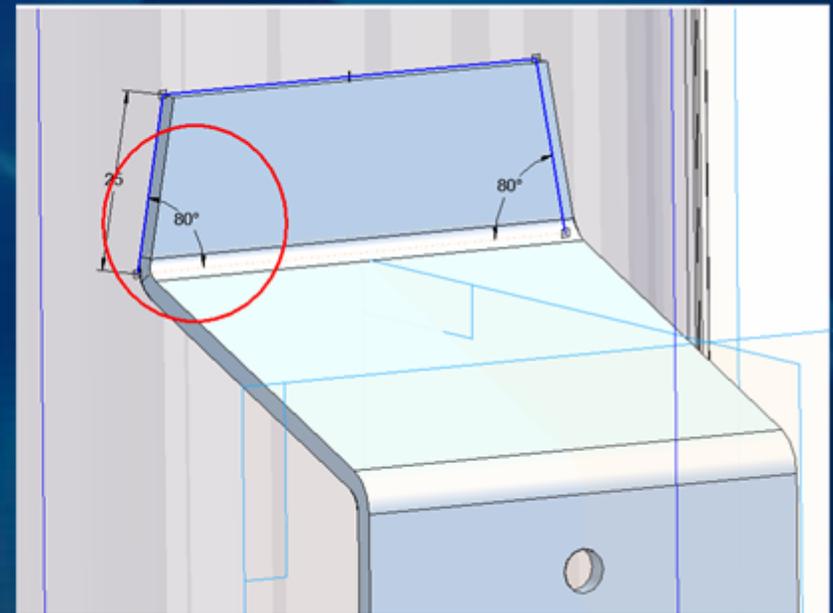
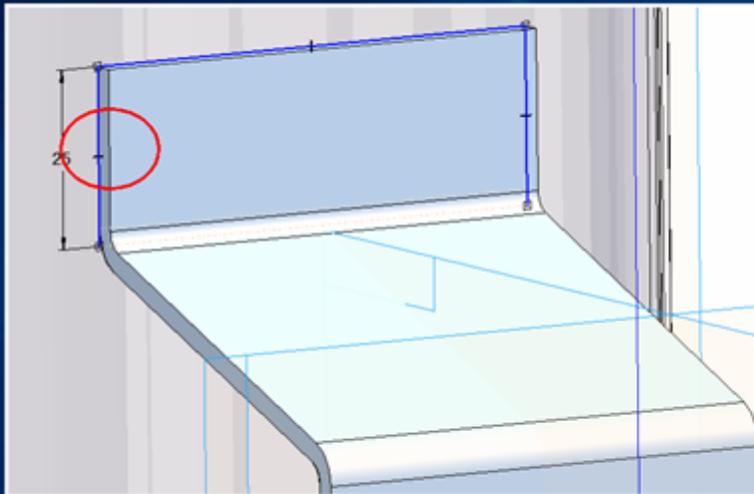




Dimensional Constraints on Flange



- ▶ The constraints for flanges have been changed so miters can be quickly added by simply changing a dimensions
- ▶ No need to enter profile and modify the constraint system for creating miters

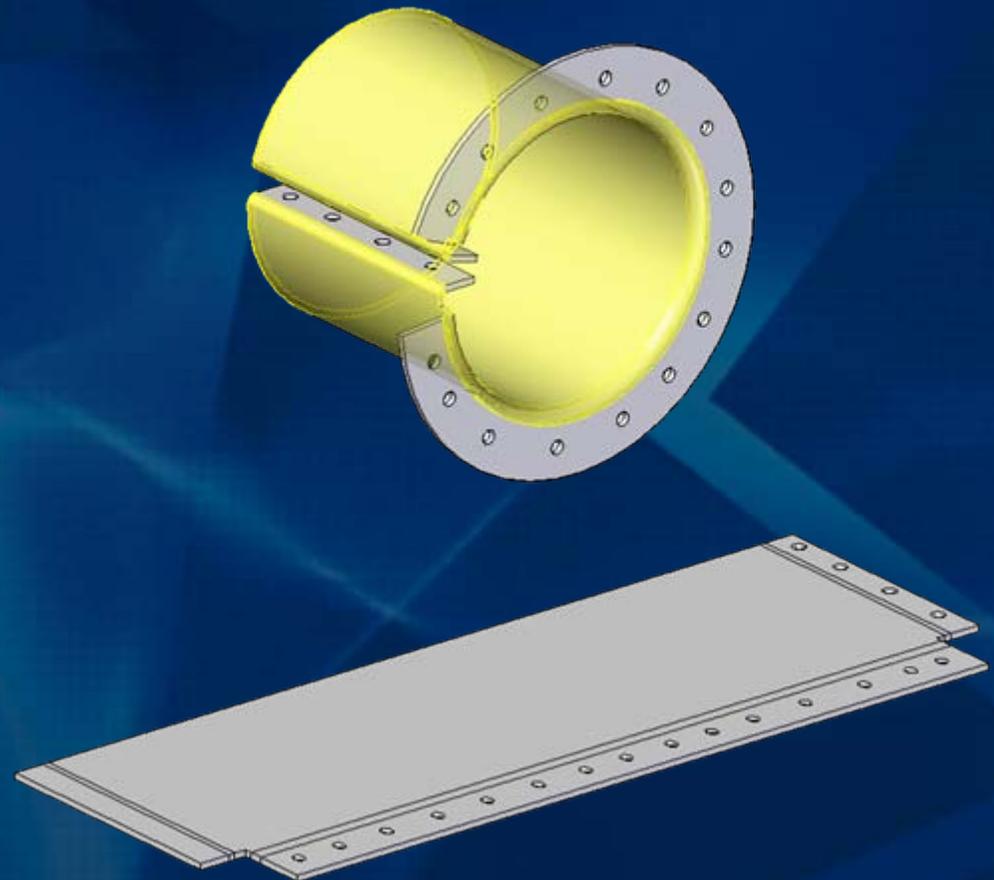
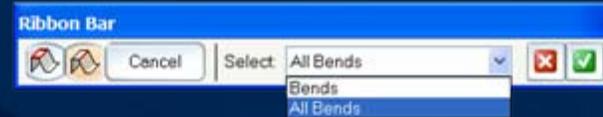




Unbend All option



- ▶ A new selection option has been added to the Unbend command to choose all bends in the model

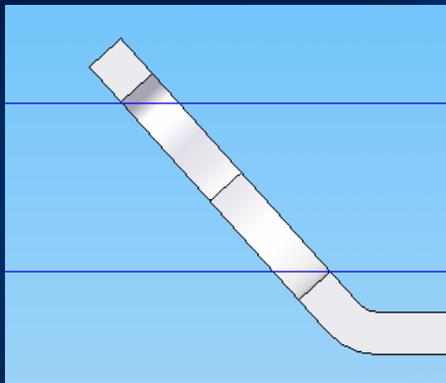




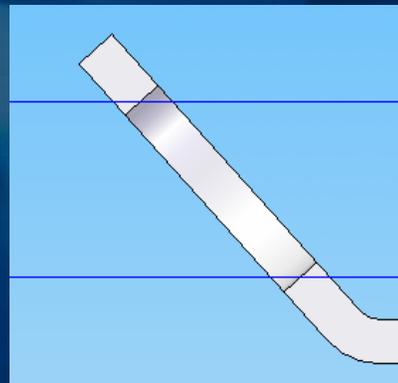
Nearest Face Normal Cutout



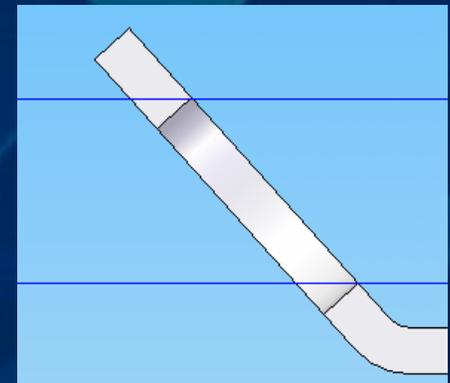
- ▶ A new option for Normal cutouts to provide a cutout normal the face closest to the profile
- ▶ Ideal for welding pips to sheet metal parts



Thickness Cut



Mid-Plane Cut



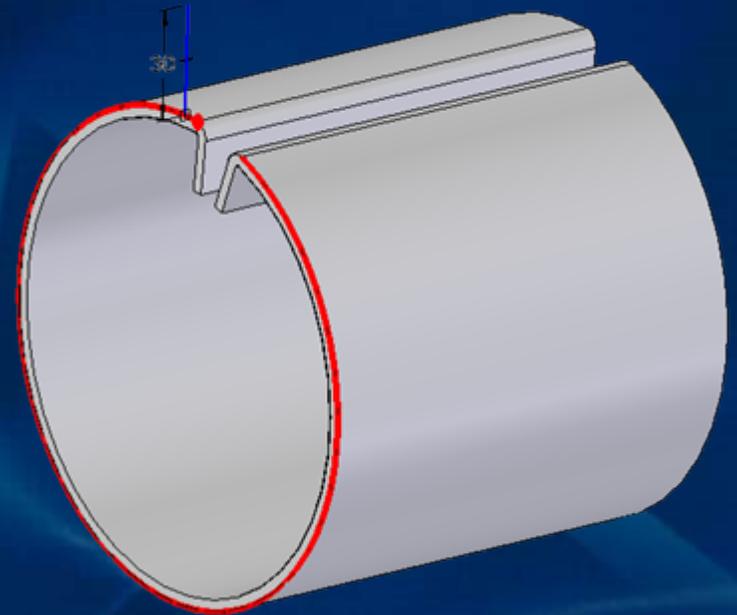
Nearest Plane Cut



Contour Flange: Usability



- ▶ Edge Highlight
 - ▶ While in Profile for the Contour Flange, the selected edge remains highlighted for easy identification
 - ▶ After a profile edit in Contour Flange, Solid Edge will automatically apply the correct material side
- ▶ Side Selection
 - ▶ Users can still backup to that step and change the side

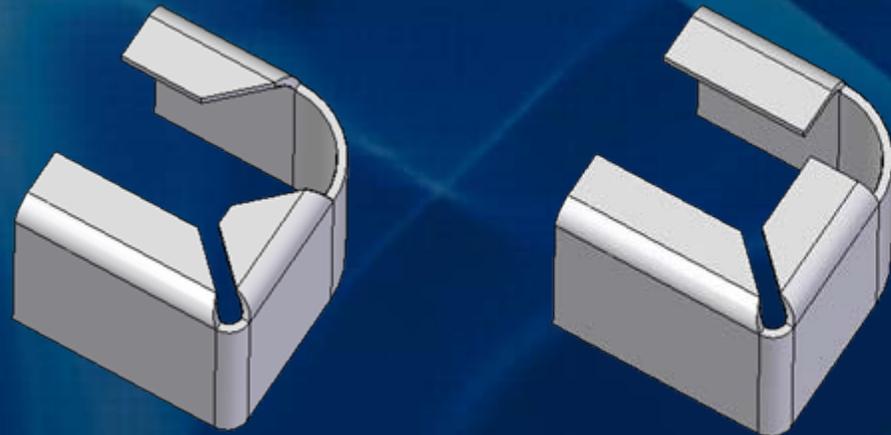
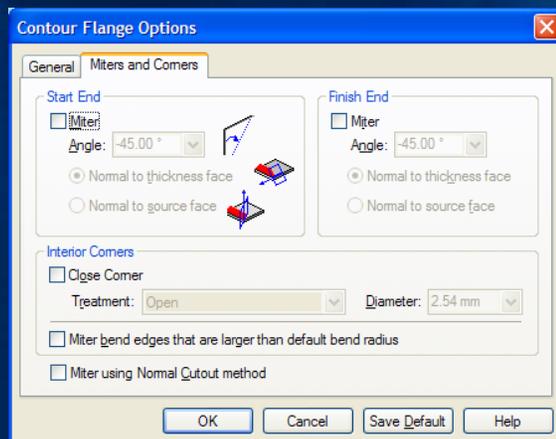




Contour Flange: Smarter Mitering



- ▶ Option to set miters on flanges around bends when the bend is larger than the default bend radius
- ▶ Option OFF by default in V19 so new files will get the correct miter by default
- ▶ Pre v19 files will have the option on to preserve existing flanges—chance are you modeled the 90 degree miter

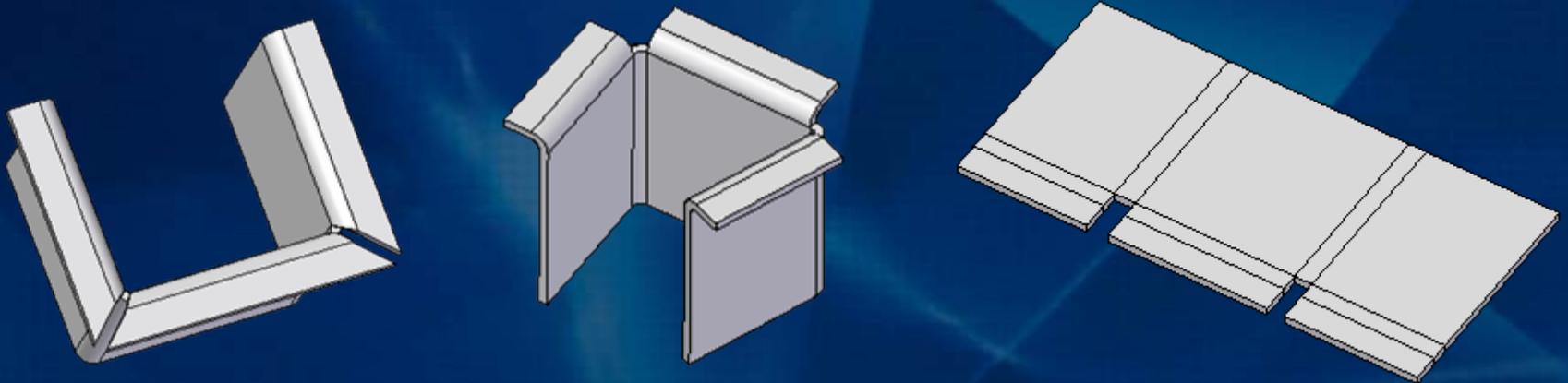




Contour Flange: Smarter Mitering



- ▶ Contour flange around an outside edge will be mitered to produce a manufacture-ready part
- ▶ There is no option to get the “old” method—we just do it right.

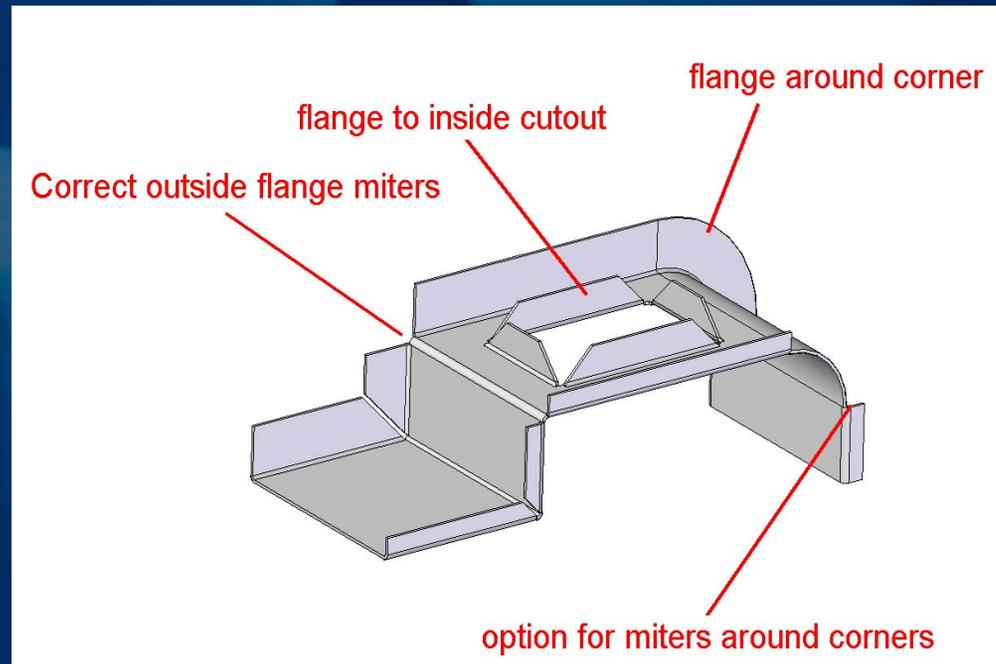




Contour Flange: Smarter Mitering



- ▶ Contour flange can now be placed around inside edges!!!!
- ▶ No special options, or sketches





Solid Edge Sheet Metal V19 Wrap Up



- ▶ Better Manufacturing Documentation
 - ▶ Bend Tables in Part
 - ▶ Bend Table in Draft
 - ▶ Bend data to DXF
 - ▶ Flat Pattern Cut Size
 - ▶ Divide Bend for Lofted Flanges
- ▶ Stiffer Models
 - ▶ Contour Flange on Curved Edges
 - ▶ Hem Command
 - ▶ Cross-Brake Feature
 - ▶ Gusset Command (Corner stiffener)
- ▶ Assembly Design
 - ▶ Flange Match Face
- ▶ General Fixes
 - ▶ Deliver Stencil Fonts
 - ▶ Enable thickness key-in for initial Contour Flange and Lofted Flange
 - ▶ Dimensions for Flange constraints
 - ▶ Unbend all
 - ▶ Enhance Normal Cutout for welding case
 - ▶ Contour Flange: Usability
 - ▶ Contour Flange: Smart Mitering

Don't forget to
attend the
hands-on