

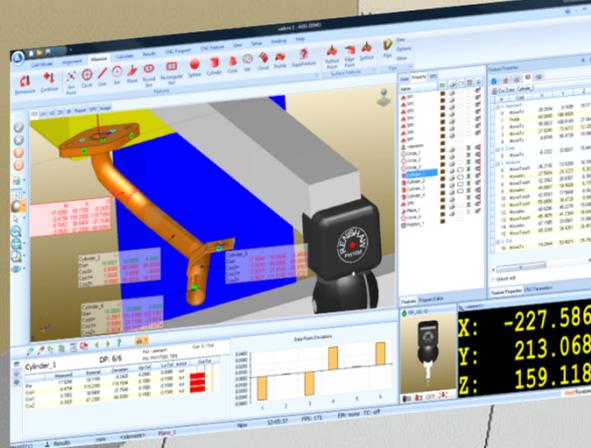
AxelSystems

Complete Solution For
Effort Free Tube Measurement



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			0.0000



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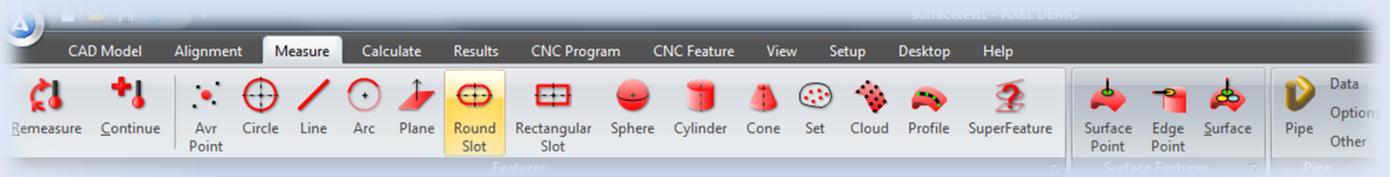
AXEL 7 TUBE

SPS
ETrimSrf339

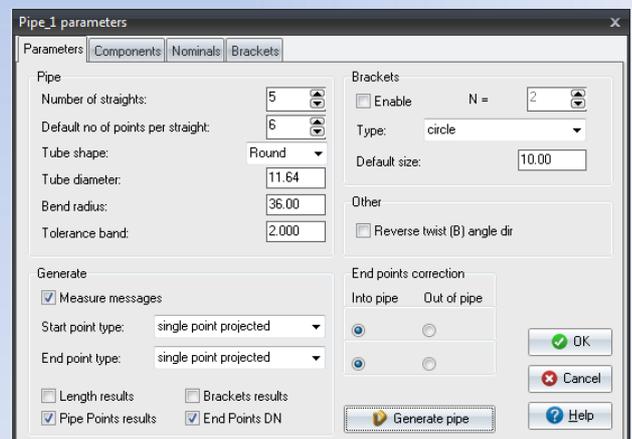
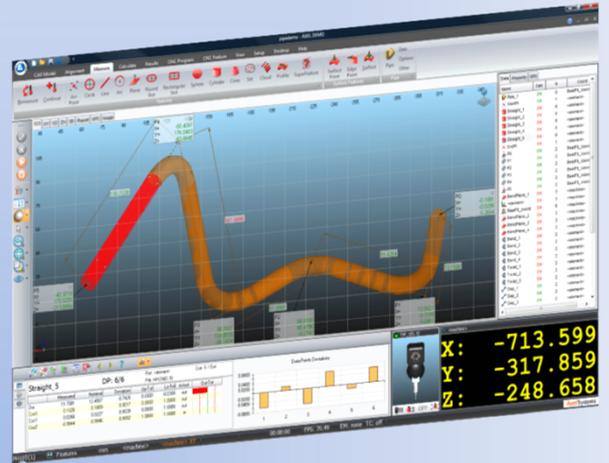
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X=	-59.0738	-59.0738	0.0000
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www.axelsystems.com

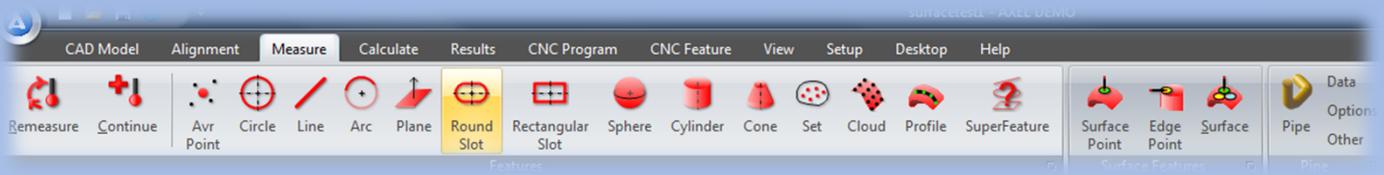
ADVANCED FEATURES MAKE AXEL EASY TO USE



- ❑ **Bend on Bend Measurement** - With Axel Pipe, the operator can choose where to take points for a 'bend on bend' construction, and then opt to remove the intersection from the 'best fit' if required
- ❑ **180° Bend Measurement** – our software can cope with multiple 180 bends in a tube assembly. The 180 bend data is entered as YBC coordinates (Pull / Rotate / Bend) and can then be converted to XYZ coordinates.
- ❑ **Intricate Assembly Measurement** – Pipe Wizard can measure intricate, intertwined parts with short straights and multiple 180 bends that our competitors would not even attempt.
- ❑ **Assembly Versatility** – Our software can measure tube assemblies, brackets, T sections and intersections, with the accuracy to measure geometrical features against master drawings.
- ❑ **Tube End Fitting Measurement** – Standard Axel Tube inspection Wizard software has 4 built in end fitting types to measure the position and angle in modern day tube assemblies – Square, Angled Face, Jagged and Flange / Banjo.
- ❑ **End point Correction** – Axel Pipe can cope with the tube start / end points being at either side of the end fitting.
- ❑ **Multiple Fit Options** – Pipe Wizard software contains multiple fit options – Best Fit / End Fit / Last End Fit. Rouge or deformed intersection points can also be excluded from the fit. Any geometrical feature such as a bracket or 'T' section can also be added.
- ❑ **Multiple Datums** – Pipe Wizard software allows multiple datums so that extra features can be displayed with respect to other datum on the tube assembly.



ADVANCED FEATURES MAKE AXEL EASY TO USE



- ❑ **Multiple Coordinates** – Axel Pipe Wizard allows data / output results to be configured as pipe coordinates or CAD / Car line / Aircraft line coordinates.
- ❑ **Data Entry** – our software allows data entry in XYZ or YBC (Pull / Rotate / Bend) format.
- ❑ **Tube Data Import / Export** – As with any system the tube nominal data can be entered at the keyboard but Axel software can also extract the tube data from CAD data or text file. The tube nominal and / or correction data can also be exported to compatible pipe benders. All of these options save time and avoid keyboard or operator errors.
- ❑ **Pipe Bender Link** – Our software come with several pipe bender download links as standard for popular manufactures such as Addison, Unison and Herber. We can create a download link free of charge for any pipe bender with the supply of the manufacturers link protocol.
- ❑ **Extended Results** – Axel Pipe Wizard not only give XYZ, YBC and envelope correction but also: Straight Miss By, Angle Deviation of each straight, End to End Length (Nominal & Measured), Total Tube Length, Tangent (Straight) Length, Total Bend and Total Rotation to help in forecasting tool wear.
- ❑ **Reverse Engineering Capability** – Axel Pipe Software have the ability to measure prototype / development tube assemblies, brackets and end fittings, before saving the measured data as IGES / DXF files and sending it to a CAD system.
- ❑ **Production Aid** – Axel Pipe Software can be used as production aids to set the position of brackets, end-fittings and 'T' sections. Simply measure the tube assembly and then use the Digital Read-Out to move the probe head to specific tube / drawing coordinates to set the bracket.



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TUBE INSPECTION REPORT

Part name	PipeDemo		
Part info	Bend Pipe2011		
User name	Axel Systems Ltd		
Machine	MAG 215		
Modified by	EG		

Pipe_1 (nominals)									
Coordinates: BestFit_coord Layer: default Probe: Red Arm(TIP_1)									
	X	Y	Z	Y(mm)	B°	C°	Bend	Dir	
0	-0.00	0.00	0.00						
1	72.73	0.00	0.00	41.00			82.73	36.00	11.64
2	84.31	80.79	0.00	-60.17	-98.81		57.27	36.00	11.64
3	100.43	133.50	-68.26	27.51	99.72		88.26	36.00	11.64
4	-88.69	178.84	-83.69	81.88	-149.15		89.80	36.00	11.64
5	-42.51	-179.87	-213.69	94.83					

Pipe_1 (deviations)									
Coordinates: BestFit_coord Layer: default Probe: Red Arm(TIP_1)									
	dx	dy	dz	Env1	Env2	Y(mm)	B°	C°	Dir°
0	0.00	0.00	-0.27						0.00
1	0.17	0.12	-0.05	0.27	0.19	-0.23	0.19	-0.23	0.50
2	-0.00	0.31	0.27	0.10	0.44	-0.43	-1.16	0.85	0.48
3	0.72	-0.50	-0.12	0.27	0.26	-0.82	1.24	0.85	1.08
4	-0.28	0.10	0.17	0.25	0.12	0.25	0.25	-0.43	0.21
5	-0.14	-0.06	0.21	0.23	0.12	-0.16			0.09

Tolerance band: 2.00 mm (PASS)
 Total length of measured tube: 495.08 mm
 Total length of nominal tube: 495.00 mm
 Tangent length: 296.80 mm
 Tangent length nominal: 295.48 mm
 Distance between centres of end faces measured: 282.90 mm
 Distance between centres of end faces nominal: 282.53 mm
 Total bend: 315.58°
 Total rotation: 343.86°

16/03/2010 18:41

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Axel Pipe

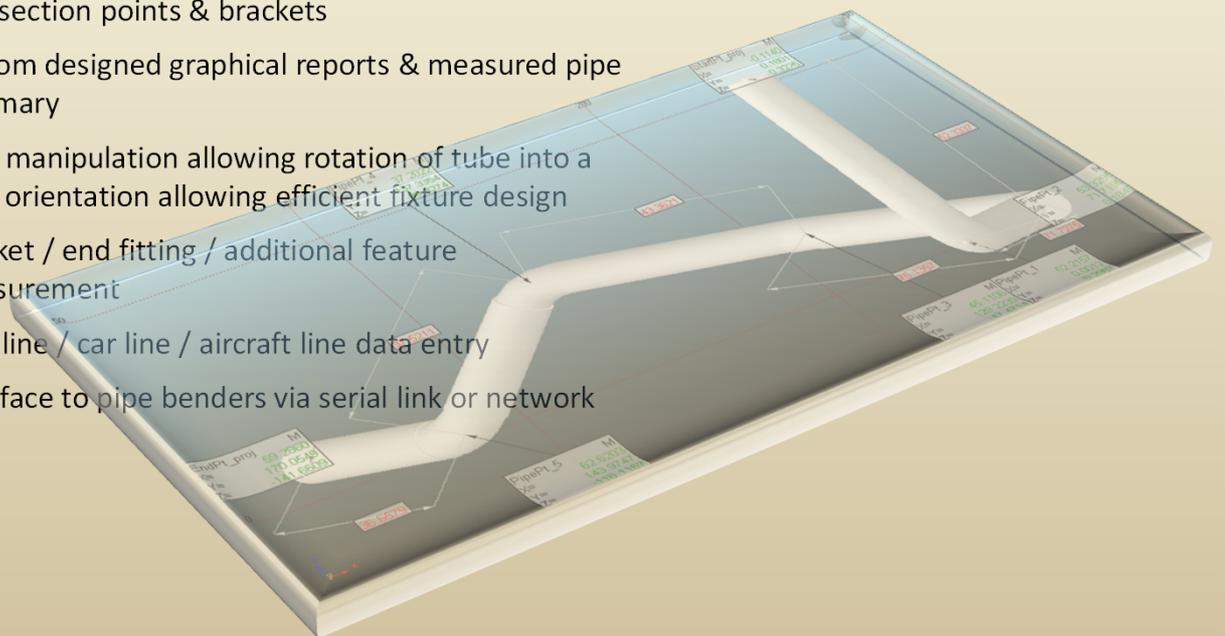
ADDS THE ABILITY TO INSPECT TUBES

The Axel Tube Wizard simplifies measurement of manipulated tube, pipe, wire or hose when used in conjunction with Axel Foundation software. Upon entering a description of the component, the Axel Tube Wizard automatically generates a measuring sequence and a 3D graphic. Tubes may be inspected as prototypes or against their nominal CAD / drawing. During measurement the operator is prompted to measure the designated features of the tube, which are also highlighted in the *Measurement Window*.

As an additional feature, result boxes are automatically posted at every bend. After the tube is measured, industry standard reports are generated for conformance purposes, containing tube correction data. Interfaces to various bending machines are also provided and incorporated as part of the Axel Tube Wizard software.

Rendering is a further feature provided in the package to assist visual presentation and accuracy. On completion of the inspection a coordinate text report is generated, containing tube correction data.

- ❑ Fully integrated with existing measurement functions allowing tube, geometric and CAD features to be measured in the same operation
- ❑ Rapid inspection of pipe fixtures with respect to pipe nominal data
- ❑ Automatic generation of 3D pipe graphic from nominal data
- ❑ Automatic generation of pipe inspection sequence
- ❑ Nominal data entry from CAD
- ❑ Nominal data conversion from car line to tube line.
- ❑ XYZ / YBC coordinate data entry & XYZ to YBC conversion
- ❑ Pipe inspection against nominal model with comprehensive selectable fit on start points / intersection points & brackets
- ❑ Custom designed graphical reports & measured pipe summary
- ❑ Data manipulation allowing rotation of tube into a 'flat' orientation allowing efficient fixture design
- ❑ Bracket / end fitting / additional feature measurement
- ❑ Pipe line / car line / aircraft line data entry
- ❑ Interface to pipe benders via serial link or network





← Inspect Fixtures and Tubes →



Axel interfaces with articulated arms and CMMs



Tube Inspection Reports

Tube Inspection Report

Part name: [blank]
Part code: [blank]
User name: Axel Systems Ltd
Machine: [blank]

Point	X	Y	Z	IP	CP	Dist	Dist
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	10.00	10.00	10.00	10.00	10.00	10.00	10.00
3	20.00	20.00	20.00	20.00	20.00	20.00	20.00
4	30.00	30.00	30.00	30.00	30.00	30.00	30.00
5	40.00	40.00	40.00	40.00	40.00	40.00	40.00
6	50.00	50.00	50.00	50.00	50.00	50.00	50.00
7	60.00	60.00	60.00	60.00	60.00	60.00	60.00
8	70.00	70.00	70.00	70.00	70.00	70.00	70.00
9	80.00	80.00	80.00	80.00	80.00	80.00	80.00
10	90.00	90.00	90.00	90.00	90.00	90.00	90.00

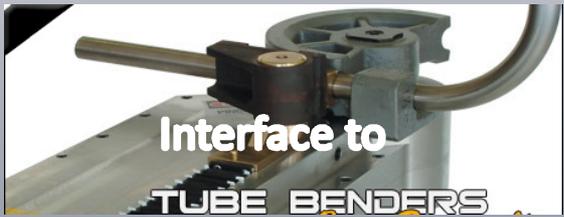
Interface to TUBE BENDERS

Part: pipedemo Date: 16/03/2010 18:41
User: [blank] Machine: [blank]

Name: Axel Systems Ltd
Part no: [blank]

Fig_1 (deviations) Coordinates: machine
Layer: offset Probe: RadAxelCP_1

Point	dx	dy	dz	dx'	dy'	dz'	dx''	dy''	dz''
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



For sales information telephone: +44 (0) 208 1336999 or email sales@axelsystems.co.uk
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