



World-class Metrology for Tube Fab

IMPORT MODELS

Import solid model data from STEP or IGES files generated by CAD packages to create MASTER data.

LASER MEASURE

Measure tube shapes using laser technology for comparison against master data or to reverse-engineer from existing parts.

QUALIFY

Fully-qualify tube shapes with inspection reports that contain tangent, midpoint, end angle deviations all compared to tolerance. Quickly verify a part shape by viewing the inspection result with shades of green (pass) or red (no pass).

DISPLAY MODELS

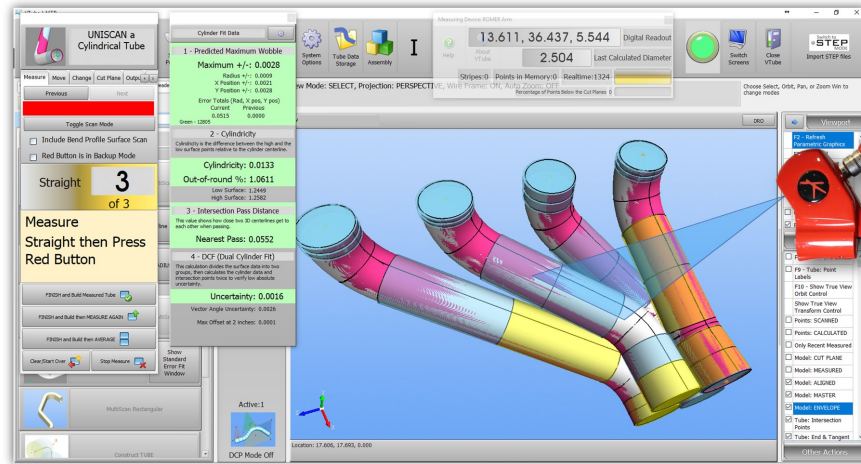
Display rendered image of measured tube, best-fit tube, and master tubes on the screen at the same time.

CORRECT BENDERS

Connect to and correct CNC benders.

ADVANCED TUBULAR
TECHNOLOGIES, INC

Phone: 248 674-2059
www.advancedtubular.com



This is the software tool designed exclusively for **tube measuring, tube-shape qualification, tube bender correction, and tube-shape reverse engineering** using laser scanners.



- VTube-LASER connects directly to Kreon arms with laser scanners to scan tube shapes faster with greater repeatability.
- Qualify tube shapes.
- Setup and correct CNC benders in minutes. Transfer of correction data takes a few seconds.
- Build SOLIDWORKS models of reverse-engineered tubes in seconds.

Kreon
The complete 3D scanning solutions





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COMPATIBLE WITH ALL
Kreon Scan Arms—VTube-
LASER connects to all models of
Kreon arms that use the standard
Kreon driver. It is compatible with
the Skyline, Solano, Zephyr, and
Aquilon laser scanners.



Solano Scanner

IMPORT SOLID MODELS
Import from any solid model CAD
package using the universal STEP
or even IGES format.

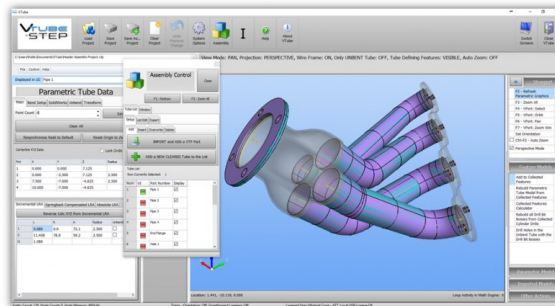
**EXTRACT CENTERLINE
DATA**
Extract centerline data to build
MASTER data for inspection. View
the results of the extraction in the
viewport using transparency.

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import

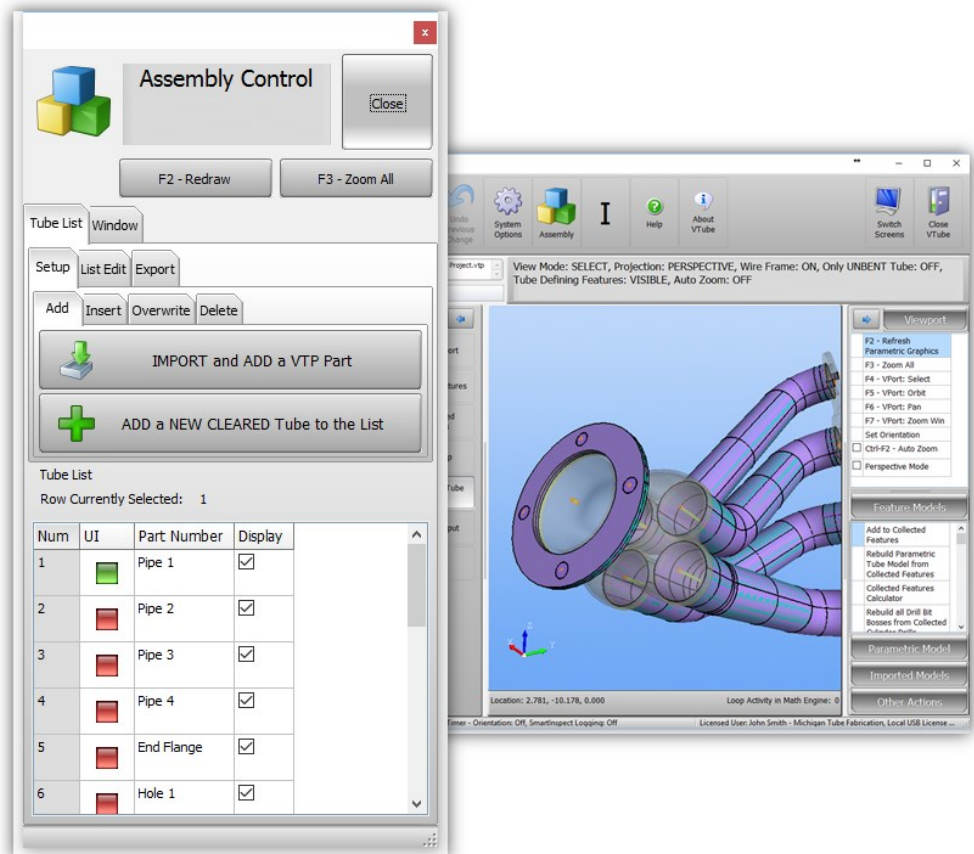
SOLID Models



The product design world is switching to
“**Model-Based Definition**” (MBD), where
solid models are used to create and
control the nominal MASTER data.

VTube enables MBD by allowing you to
import master tube shape data from the
universal STEP or IGES files – which
means you can import from any solid
model package.

Import one tube or entire assemblies
into on VTube-LASER project file.



Assembly Control

F2 - Redraw F3 - Zoom All

Tube List Window

Setup List Edit Export

Add Insert Overwrite Delete

IMPORT and ADD a VTP Part

ADD a NEW CLEARED Tube to the List

Tube List

Row Currently Selected: 1

Num	UI	Part Number	Display
1		Pipe 1	<input checked="" type="checkbox"/>
2		Pipe 2	<input checked="" type="checkbox"/>
3		Pipe 3	<input checked="" type="checkbox"/>
4		Pipe 4	<input checked="" type="checkbox"/>
5		End Flange	<input checked="" type="checkbox"/>
6		Hole 1	<input checked="" type="checkbox"/>

View Mode: SELECT, Projection: PERSPECTIVE, Wire Frame: ON, Only UNBENT Tube: OFF, Tube Defining Features: VISIBLE, Auto Zoom: OFF

Viewport

F2 - Refresh
F3 - Zoom All
F4 - VPort: Select
F5 - VPort: Orbit
F6 - VPort: Pan
F7 - VPort: Zoom Win
Set Orientation
 Ctrl-F2 - Auto Zoom
 Perspective Mode

Feature Models

Add to Collected Features

Rebuild Parametric Tube Model from Collected Features

Collected Features Calculator

Rebuild all Drill Bit Bosses from Collected Production Profile

Parametric Model

Imported Models

Other Actions

Location: 2.781, -10.178, 0.000 Loop Activity in Math Engine: 0

Printer - Orientation: Off, SmartInspect Logging: Off Licensed User: John Smith - Michigan Tube Fabrication, Local USB License



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inspection

VISUALIZE DEVIATIONS

The measured tube is fit on the master tube using sophisticated fit technology, then displayed on the screen for visualization.

INSPECTION GRID COLOR CODES

Solid Green: The deviation is less than $\frac{1}{2}$ the tolerance.

Light Green: The deviation ok, but is greater than $\frac{1}{2}$ the tolerance.

Light Red: The deviation is out of tolerance by less than 2 times the tolerance.

Solid Red: The deviation is out of tolerance by greater than 2 times the tolerance.



ACE Skyline
Scanner

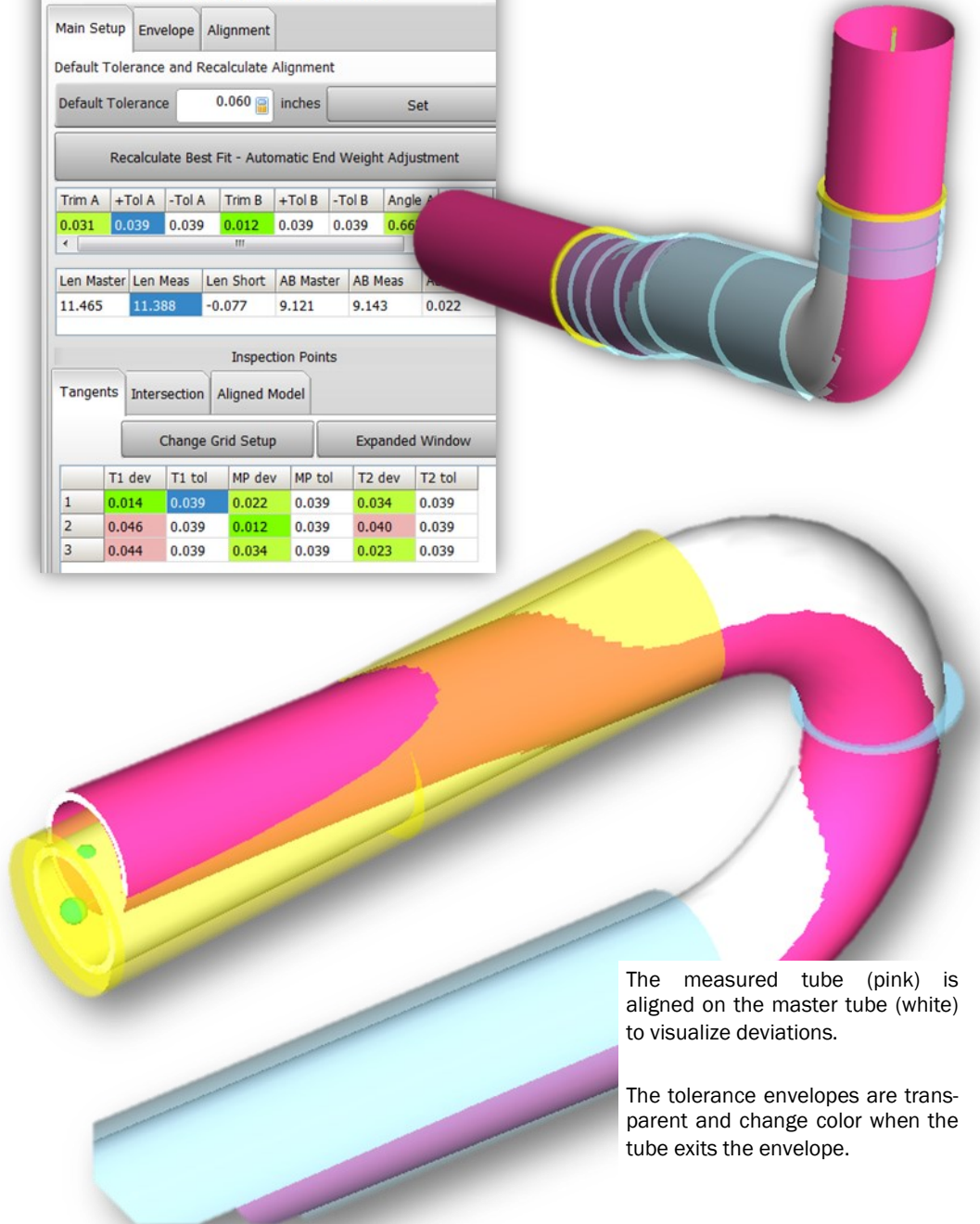
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Part Qualification

Fully qualify the part using the Inspection Results grid. Color codes give a quick indication of pass/fail for part qualification. Print customizable inspection reports to document the qualification.

Inspection Data						
Main Setup		Envelope		Alignment		
Default Tolerance and Recalculate Alignment						
Default Tolerance		0.060 inches		Set		
Recalculate Best Fit - Automatic End Weight Adjustment						
Trim A	+Tol A	-Tol A	Trim B	+Tol B	-Tol B	Angle A
0.031	0.039	0.039	0.012	0.039	0.039	0.66
Len Master Len Meas Len Short AB Master AB Meas AB Meas						
11.465	11.388	-0.077	9.121	9.143	0.022	
Inspection Points						
Tangents		Intersection		Aligned Model		
Change Grid Setup			Expanded Window			
	T1 dev	T1 tol	MP dev	MP tol	T2 dev	T2 tol
1	0.014	0.039	0.022	0.039	0.034	0.039
2	0.046	0.039	0.012	0.039	0.040	0.039
3	0.044	0.039	0.034	0.039	0.023	0.039



The measured tube (pink) is aligned on the master tube (white) to visualize deviations.

The tolerance envelopes are transparent and change color when the tube exits the envelope.



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benderlink

Bender Communication

Connect up to 100 CNC benders using the VTube-LASER Benderlink system. Network benders on your shop floor to correct the part shape in a seconds.

BENDERLINK

We can help you integrate VTube-LASER to benders. We're known as Benderlink specialists.

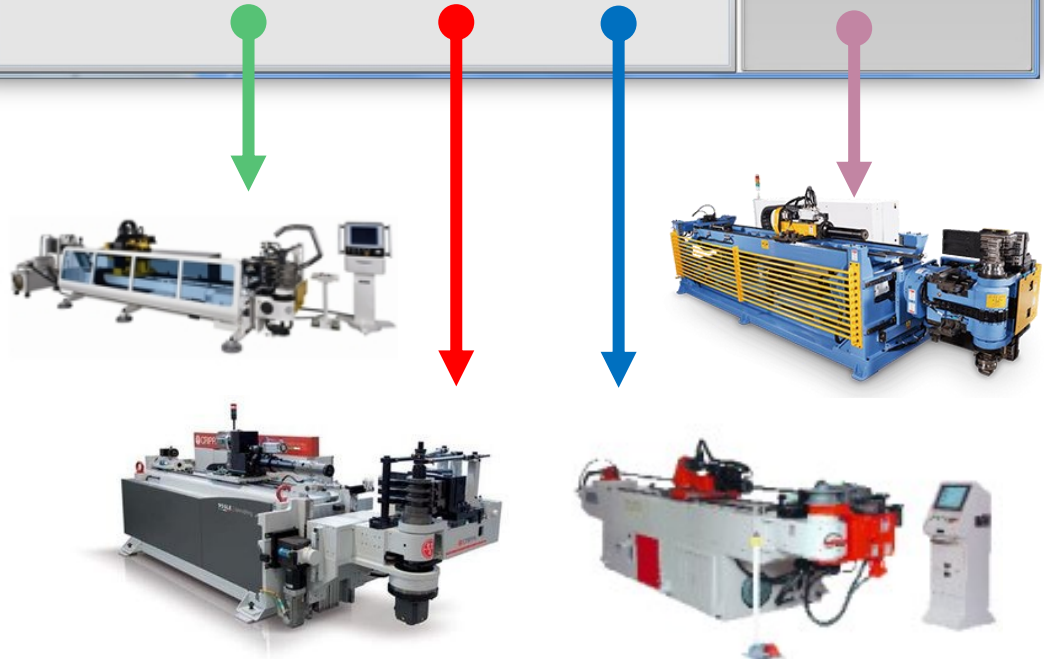
LEAPFROG

For tubes that are longer than the arm reach, VTube-LASER uses the LEAPFROG feature using magnetic conical seats we call "targets".

KNOWLEDGEBASE

We have a comprehensive web-based knowledgebase that is available to all customers for details about our products – including revision details, technical documents, tutorials, and videos.

	Length	Adjust	SB Adjust	NEW Len	Rotation	Adjust	Invert	NEW Rot	Angle	Adjust	SB Adjust	NEW Ang	Radius
1	15.3	-76.1	0.00	0.0	0.0	0.0	<input type="checkbox"/>	0.0	54.7	-0.3	0.0000	54.6	70.0
2	40.3	-10.8	0.00	34.9	-128.7	-6.3	<input type="checkbox"/>	-131.8	18.7	-1.1	0.0000	18.2	70.0
3	8.7	18.7	0.00	18.0	-55.8	-0.6	<input type="checkbox"/>	-56.1	77.0	-1.2	0.0000	76.4	70.0
4	58.8	-313.5	0.00	0.0									



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reporting

Flexible Reporting

TUBE DATA STORAGE

VTube can permanently store every measure in each tube's project file. Tube Data Storage records a permanent date-time stamped image of the data after every measure.

DATA for GAGE STUDIES

The Tube Data Storage feature is perfect for collecting data for GR&R studies – because all the data can be transferred to a Microsoft Excel spreadsheet with a button press.

Design reports with HTML report templates using our sample reports. Add any number of custom report templates to the list for use in different situations.

VTUBE REPORT MERCURY PRODUCTS
ENGINEERED FABRICATIONS & ASSEMBLIES

Date: 4/1/2011 7:57:50 AM
Part Number: 24858
Comment 1: Measure short end
Comment 2: first
Unit: Inches
Diameter: 1.712
Wall: 0.030
Default Radius: 3.750
XYZ Points: 3
Cut Length: 18.434
Calculated Master Length: 18.434
Calculated Measured Length: 18.435
Calculated Master-Measured Delta: 0.000
A-End Offset: 0.000
B-End Offset: 0.000
Tube Elongation Percentage: 6.5
Fixed Springback: 0.0
Proportional Springback: 0.0

Point	X	Y	Z	Radius
1	-16.914	2.058	30.097	
2	-15.797	2.778	24.360	
3	-23.927	2.466	14.235	

MASTER XYZ DATA

Point	X	Y	Z	Radius
1	0.000	0.000	0.000	
2	7.608	0.000	0.000	1.710
3	4.391	-6.964	0.000	2.000
4	4.874	-11.000	0.000	2.000
5	1.645	-10.000	0.000	2.000
6	1.877	-19.871	0.000	

VTUBE REPORT MERCURY PRODUCTS
ENGINEERED FABRICATIONS & ASSEMBLIES

Date: 4/1/2011 9:46:13 AM
Part: VTube-LASER Test Part - Dense
Number: LASER Scan
Unit: Inches
Diameter: 0.625
XYZ Points: 7
Cut Length: 23.893

Point	X	Y	Z	Radius
1	-19.446	0.942	20.785	
2	-18.071	1.374	22.289	2.000
3	-13.280	-0.908	23.293	2.000
4	-8.893	-0.354	25.340	2.000
5	-11.231	-1.311	30.765	2.000
6	-8.107	1.290	32.668	2.000
7	-4.888	1.715	34.147	

Bend	Length	Rotation	Angle	Radius
1	2.945		44.2	2.000
2	2.099	179.6	44.4	2.000
3	2.056	91.0	89.2	2.000
4	2.049	-150.5	88.9	2.000
5	2.004	-88.2	29.5	2.000
6	3.068			

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40

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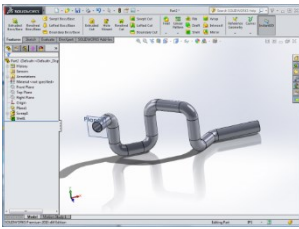
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reference

BUILD to SOLIDWORKS

VTube can even build a fully constrained 3DSketch centerline tube with sweep and shell in a few seconds. You can measure a tube, then let VTube draw it for you in SolidWorks.



COPY MEASURED to MASTER

Reverse-engineering is simple: Copy MEASURED to MASTER data with the single press of a button in the Data Handling menu.

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“Until we purchased VTube-LASER the tube measuring process was very slow and painful. Now we find ourselves measuring tubes more frequently to ensure good quality parts. VTube has allowed us to be more productive and reduce scrap rates. With past tube measuring software we were required to hard probe which was much slower and required us to fixture the parts. **VTube-LASER is the fastest and most accurate tube measuring / bender correction software that I am aware of.**”

“Since we are a SolidWorks-based company, it is very beneficial that, **with one button click, I can have a fully-defined 3D cad model of the tube that was just measured.** This decreases the amount of time it takes to get a hard prototype reverse engineered into CAD for fixture creation. I am very excited to welcome VTube-LASER into our facility and look forward to working with Advanced Tubular in the future.”

Greg Whittle
Senior Design Engineer