



# TubeShaper v1.7

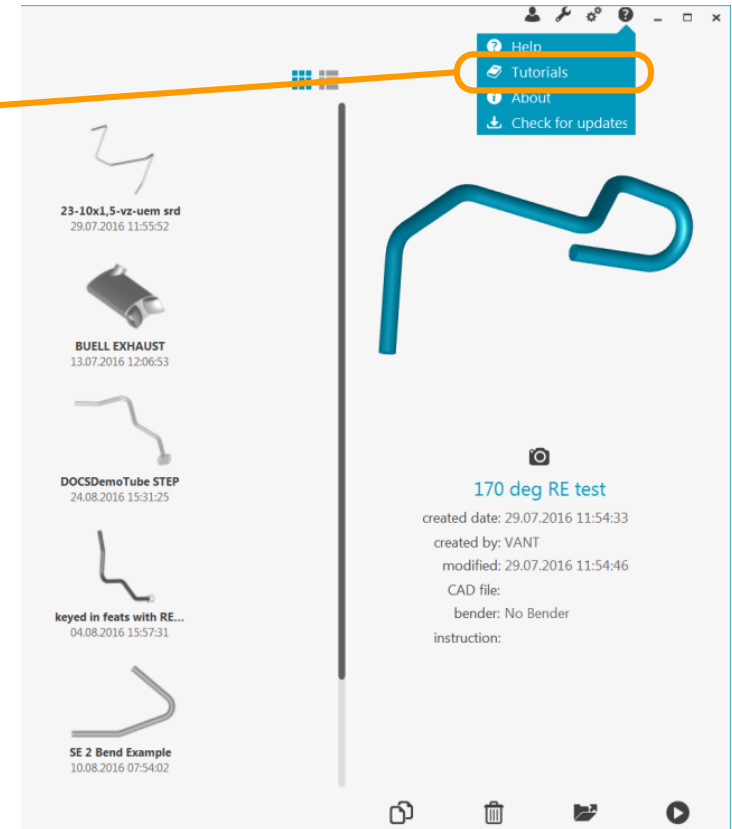
---

22<sup>nd</sup> Feb 2017



# TubeShaper Release v1.7: What's New?

- TubeShaper v1.7 has the following new functions:
  - **All new tutorials:** the most recent tutorials are now always included in new versions of TubeShaper. Please use them as much as possible. Click on the 'help' icon and then 'Tutorials' to find them (see image below).
  - **Contextual help:** just press the 'F1' key at any time to be taken to the relative section of the help.



# TubeShaper Release v1.7: What's New?

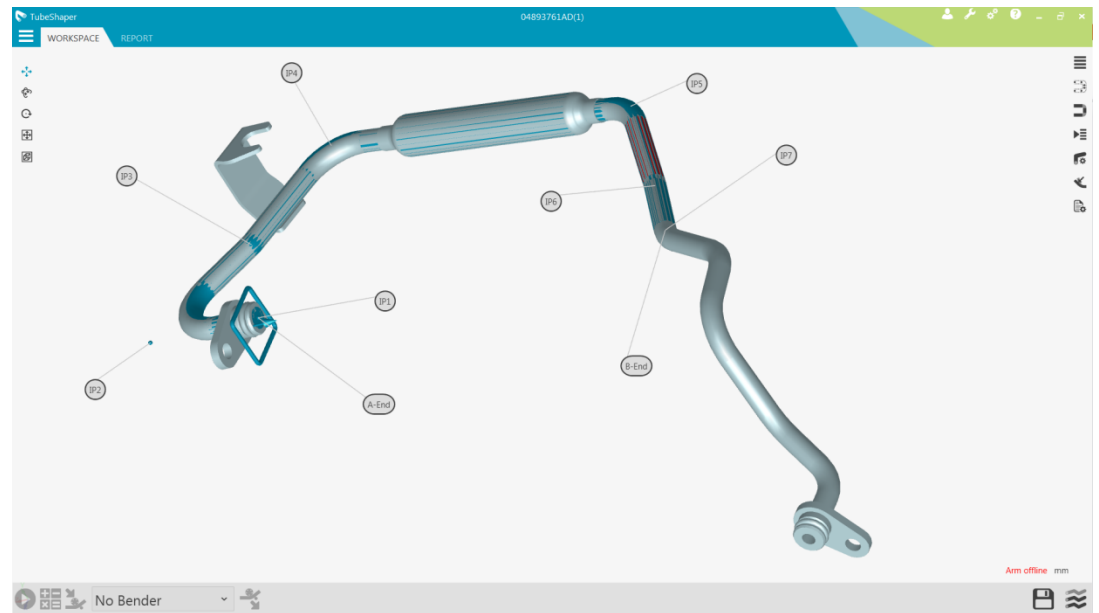
- TubeShaper v1.7 has the following new functions:
  - **New bender interfaces:** TubeShaper is now available with **Herber** tube benders.




- **Inverse bend rotations are now possible.** Most tube bending machines rotate the tube anti-clockwise, calling this direction 'negative' (in the same way that an anti-clockwise 3D rotation in CAD is generally positive). Other benders rotate anti-clockwise however, and call this rotation 'positive.' There is now a setting (for SV Networked benders) that allows you to simply invert the rotation operations, so that for example a +60 deg rotation becomes -60deg.

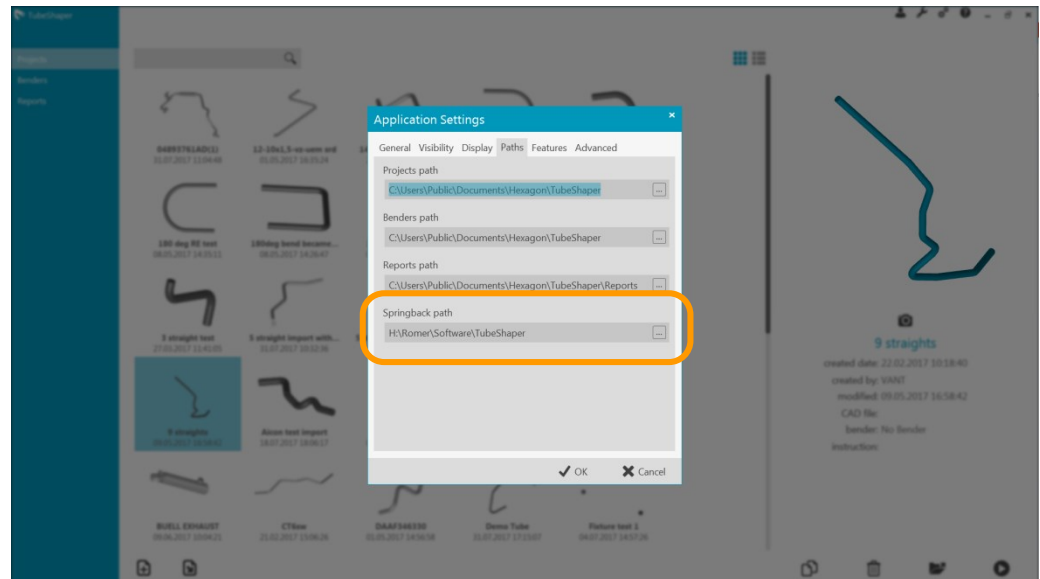
# TubeShaper Release v1.7: What's New?

- TubeShaper v1.7 has the following new functions:
  - **Create a tube from constructed features:** you can now create new tubes from measured (and constructed) features. This is important if:
    - You import a CAD model and the tube is not extracted. **See Tutorial 2.5 for details**
    - You have to create a tube by measuring a jig or fixture. **See Tutorial 4.2 for details**



# TubeShaper Release v1.7: What's New?

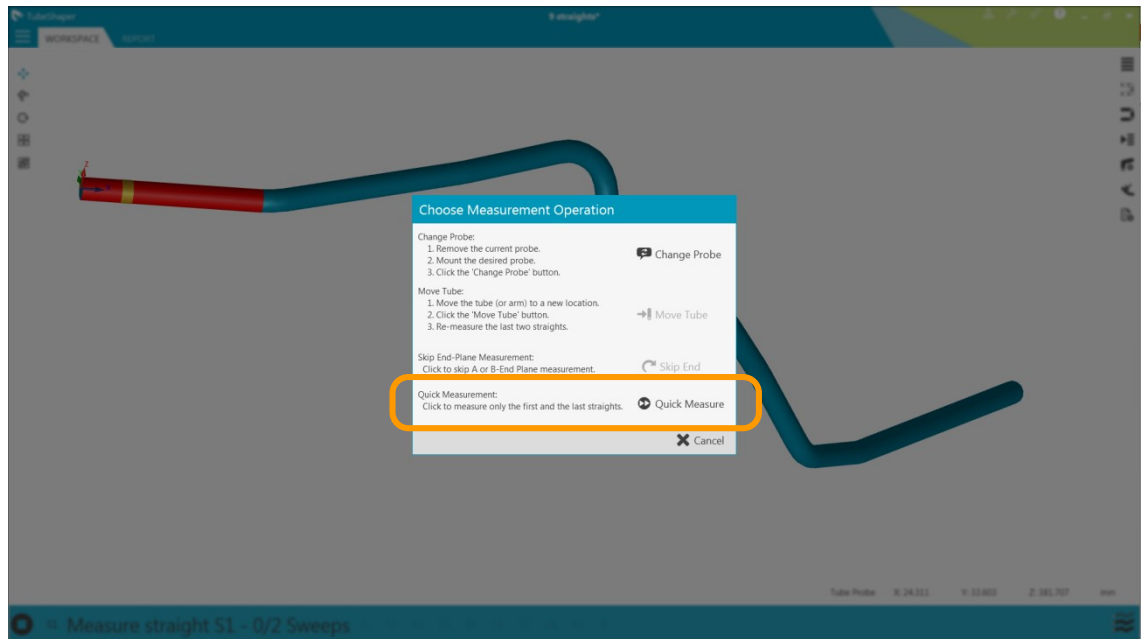
- TubeShaper v1.7 has the following new functions:
  - **TubeShaper files can now be opened from any file location**, not just from inside the TubeShaper directory. Just click on a 'tsp' file  in any directory, and TubeShaper will launch.
  - **Spring-back and elongation information can now be shared across networks**. This means that different seats of TubeShaper can all access the same spring-back information.



- You can set the file location for the spring-back data by going to the Application Settings and then the 'Paths' menu.

# TubeShaper Release v1.7: What's New?

- TubeShaper v1.7 has the following new functions:
  - **Quick Measurement:** this is a function designed for manufacturer's of long tubes, so that they can make a very quick check of the end angles, without having to measure all of the tube straights.
  - To launch Quick Measurement simply start the measurement and **press the middle arm button** for 2 seconds, then select the 'Quick Measurement' command. You will be asked to measure **only** the first and last straights.



- The Quick Measurement function will not give you intersection or tangent point errors, but it does give you values for the end lengths and angles.



# TubeShaper v1.6

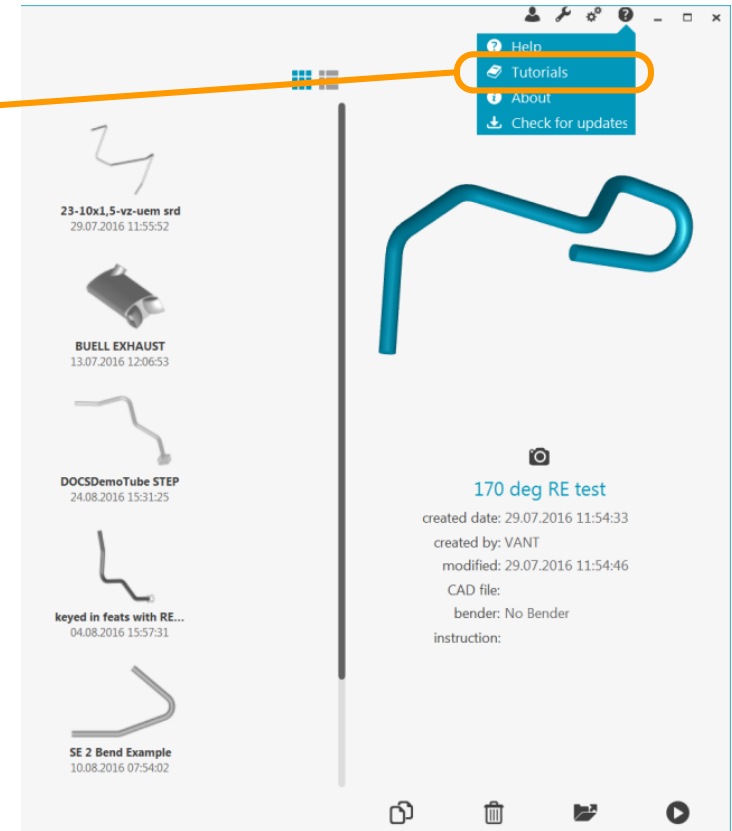
---

22<sup>nd</sup> Feb 2017



# TubeShaper Release v1.6: What's New?

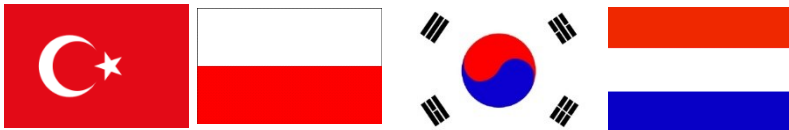
- TubeShaper v1.6 has the following new functions:
  - **All new tutorials:** the most recent tutorials are now always included in new versions of TubeShaper. Please use them as much as possible. Click on the 'help' icon and then 'Tutorials' to find them (see image below).



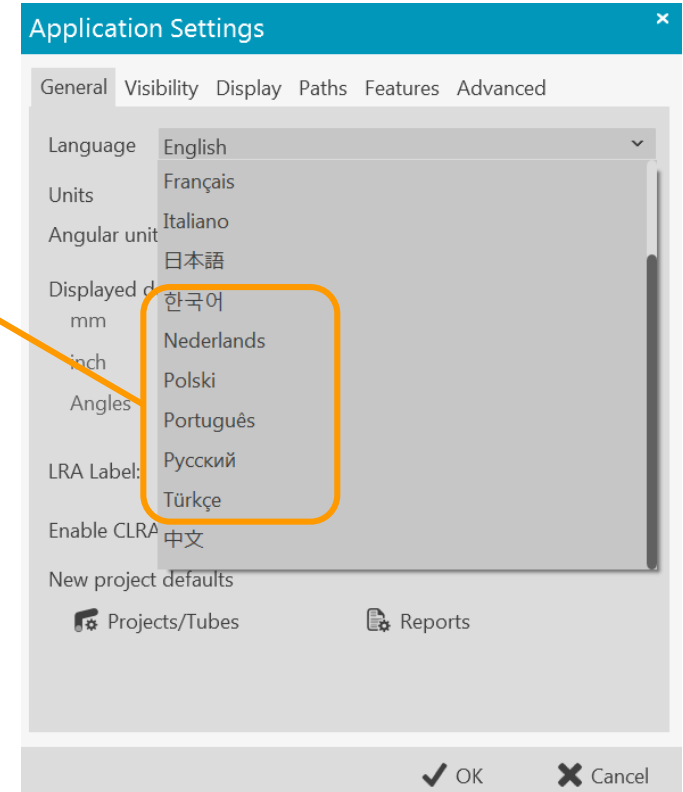


# TubeShaper Release v1.6: What's New?

- TubeShaper v1.6 has the following new functions:
  - **All new languages:** TubeShaper is now available in Dutch, Korean, Polish and Turkish.



- **New bender interfaces:** TubeShaper is now available with **Numalliance** and **Addison McKee MkIII** interfaces.



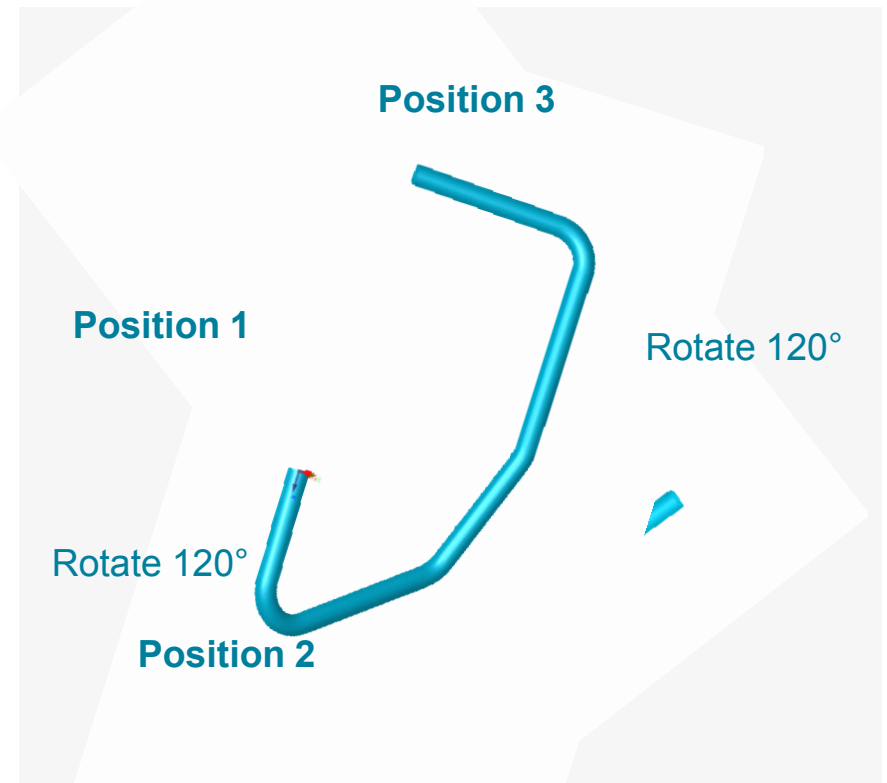
## TubeShaper Release v1.6: What's New?

- TubeShaper v1.6 has the following new functions:
  - **Average tube calculation:** TubeShaper can now measure the same tube several times, and then calculate an average tube from the results. This is important for **very flexible tubes, which are difficult to fix**, because it will help you arrive at the correct tube shape. For example, brake-lines and hydraulic hoses.



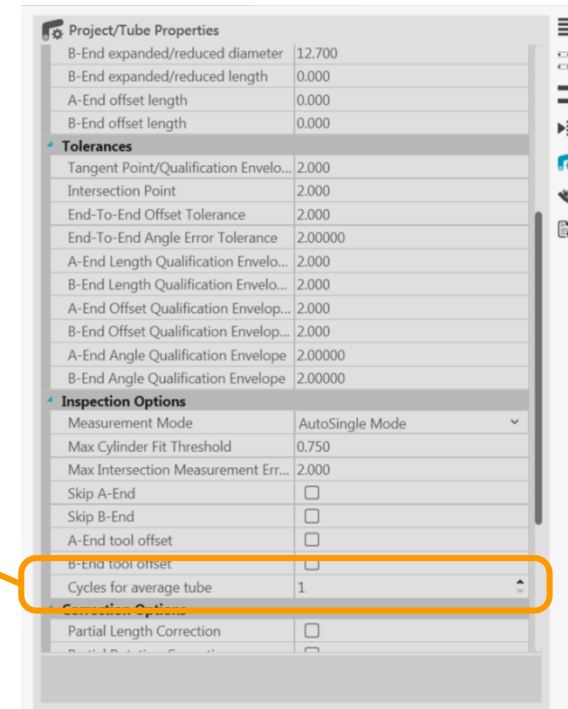
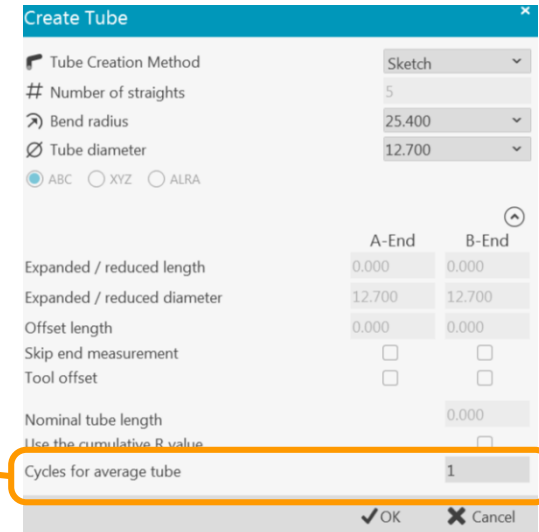
## TubeShaper Release v1.6: What's New?

- How does the average tube function work?
  - After the tube is measured, it is rotated to a new position, so that it changes shape.
  - The user can always define how many measurements (or cycles) is necessary. Generally 3 cycles is enough to give a good result, but you can use 4, 5, 6 or even 15 if you need.



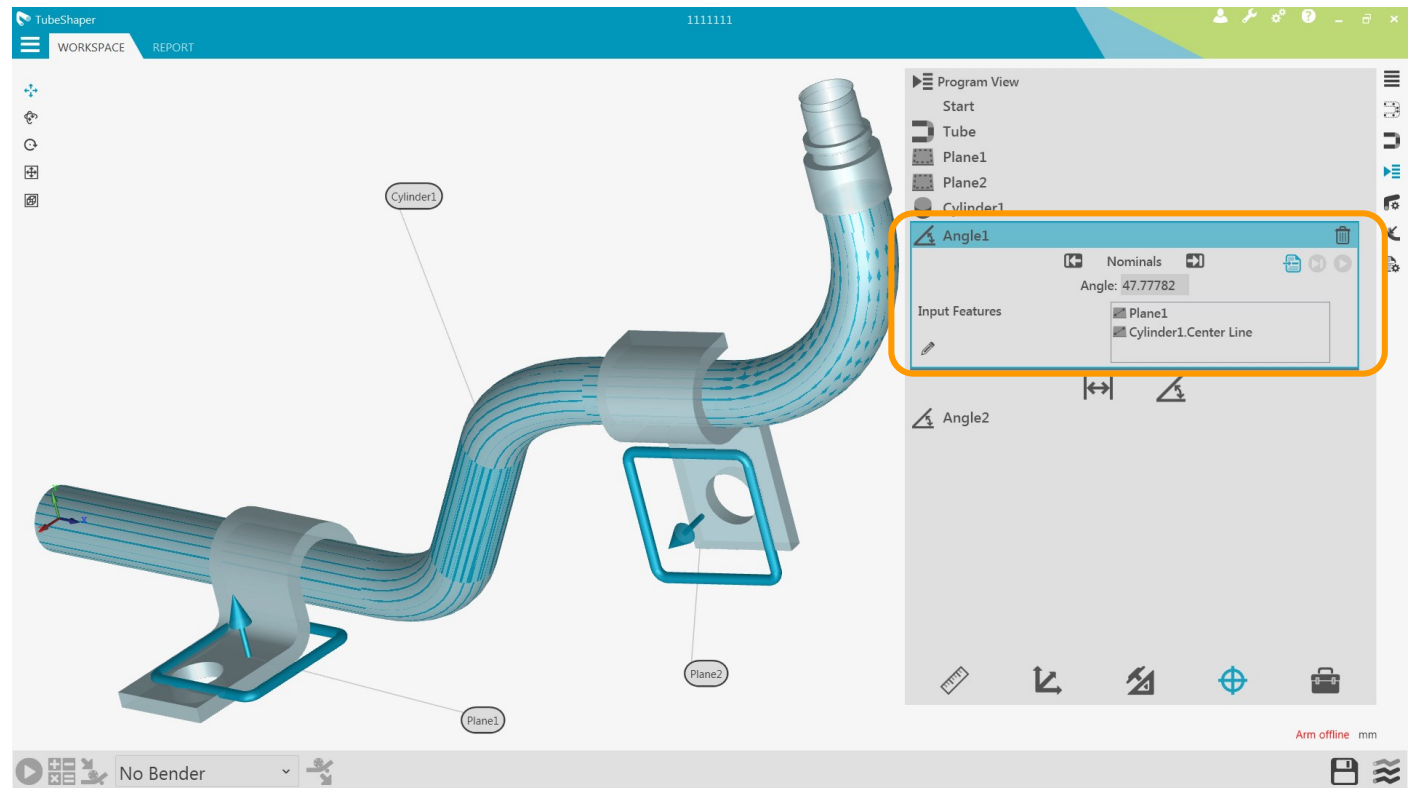
# TubeShaper Release v1.6: What's New?

- How does the average tube function work?
  - It can be used in 2 ways: during reverse engineering (so for creating a nominal tube) and during measurement of a nominal tube:
  - **For reverse engineering**, simply open the 'advanced' section of the Tube Creation menu, and set the 'cycle' value to the number of measurements you want. If you put '3' you will have to measure the tube 3 times. If you put '9' it will be 9 times.
  - **For inspection**, the number of cycles can be found in the project properties. If the value is set to a number higher than 1, you will have to measure the tube that number of times. The resulting **measured** tube will then be made from the calculated average values, before it is compared to the nominal tube.



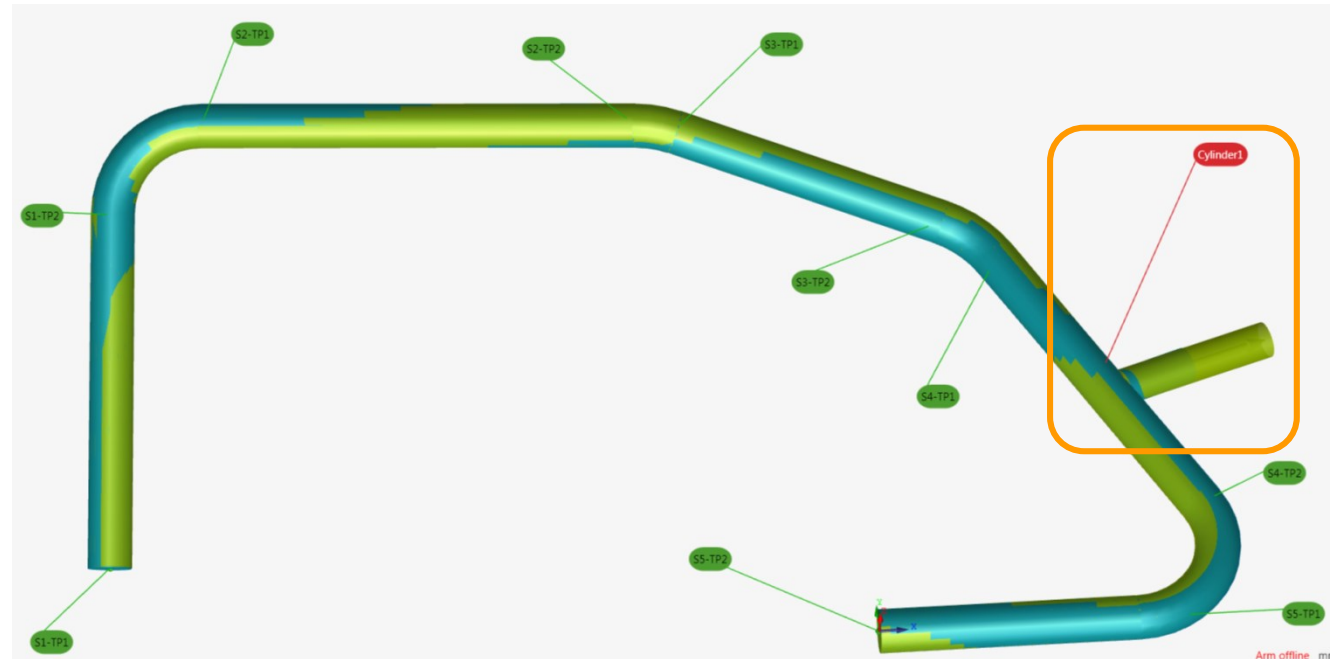
# TubeShaper v1.6

- TubeShaper v1.6 has the following new functions:
  - **Improved calculation of angles:** Angles can now be calculated between 2 planes, planes and cylinders, planes and lines and so on. You can see an example here.



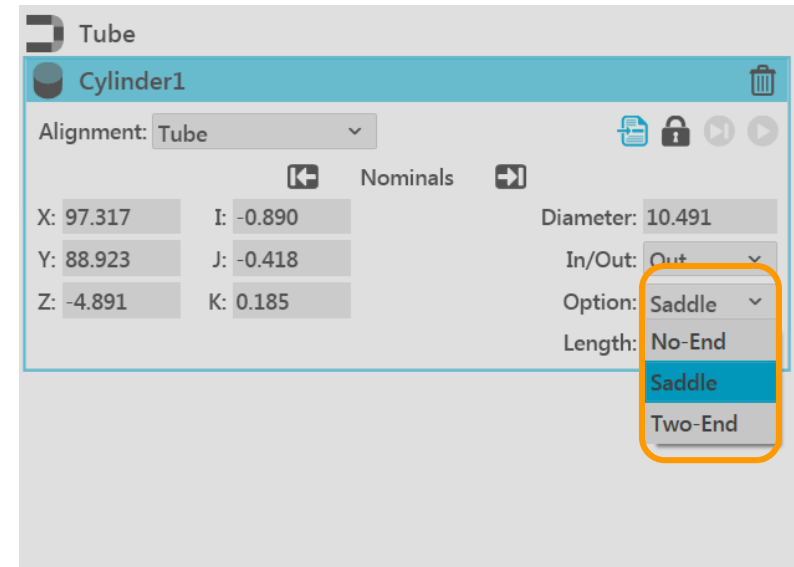
# TubeShaper Release v1.6: What's New?

- TubeShaper v1.6 has the following new functions:
  - **Measuring cylinders with the tube probe:** TubeShaper can now measure cylinder features with the tube probe. This means that you can run a program that contains a tube and cylinders, measuring the complete program with the tube probe! No need to mount the touch probe!



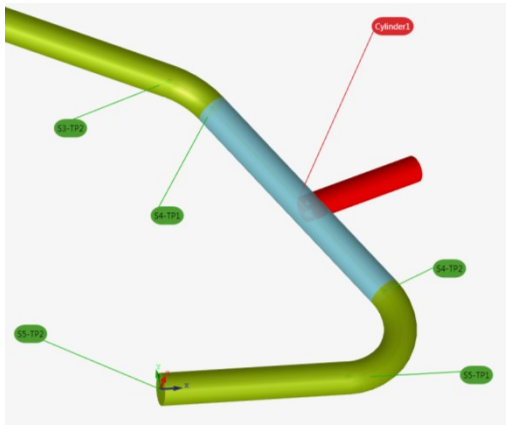
# TubeShaper Release v1.6: What's New?

- How does measuring cylinders with a tube probe work?
  - When you create a cylinder in the Program View, you have to set up the method for measuring the cylinder ends. There are 3 ways to do this:
    - **No-End:** this means that you cannot measure either end of the cylinder, because there is no access.
    - **Saddle:** this means that **one end** of the cylinder is joined on to the tube. When you measure the cylinder, you will also have to measure the relative tube straight, so the intersection may be calculated.
    - **Two-End:** this means that you should measure both ends of the tube with the tube probe.



## TubeShaper Release v1.6: What's New?

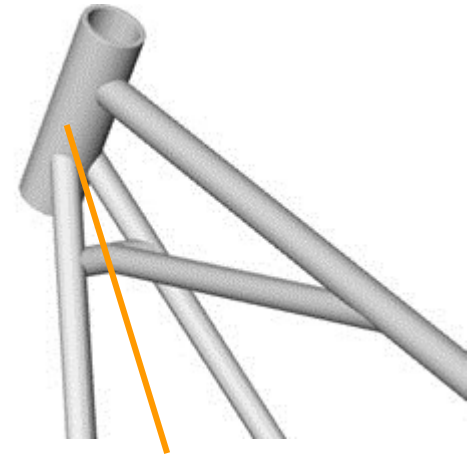
- No-End, Saddle or Two-End Cylinder?



Example of a **'Saddle'** cylinder. The free end of the red cylinder is measured with the tube probe. You then measure the blue straight of the tube, so that the intersection point can be calculated.



Example of a **'No-End'** cylinder. You can see that the central bar is joined to the tube at both ends, and so measuring the ends is impossible.

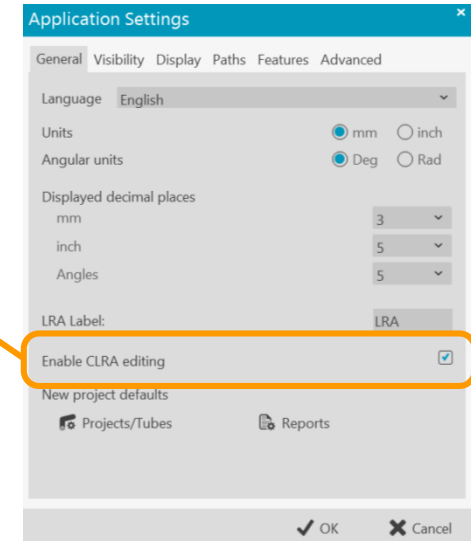


Example of a **'Two-End'** cylinder. You can see that the top cylinder can be accessed at both ends. You should measure each end with the tube probe.



# TubeShaper Release v1.6: What's New?

- TubeShaper v1.6 has the following new functions:
  - **CLRA editing:** You can now manually edit the data which is sent to the bender. This allows users to make small changes to the tube if necessary.
  - CLRA editing is **not allowed** with TubeShaper in the default configuration. If you wish to activate it, you can go to the Application Settings menu, and activate the checkbox.



## **WARNING!**

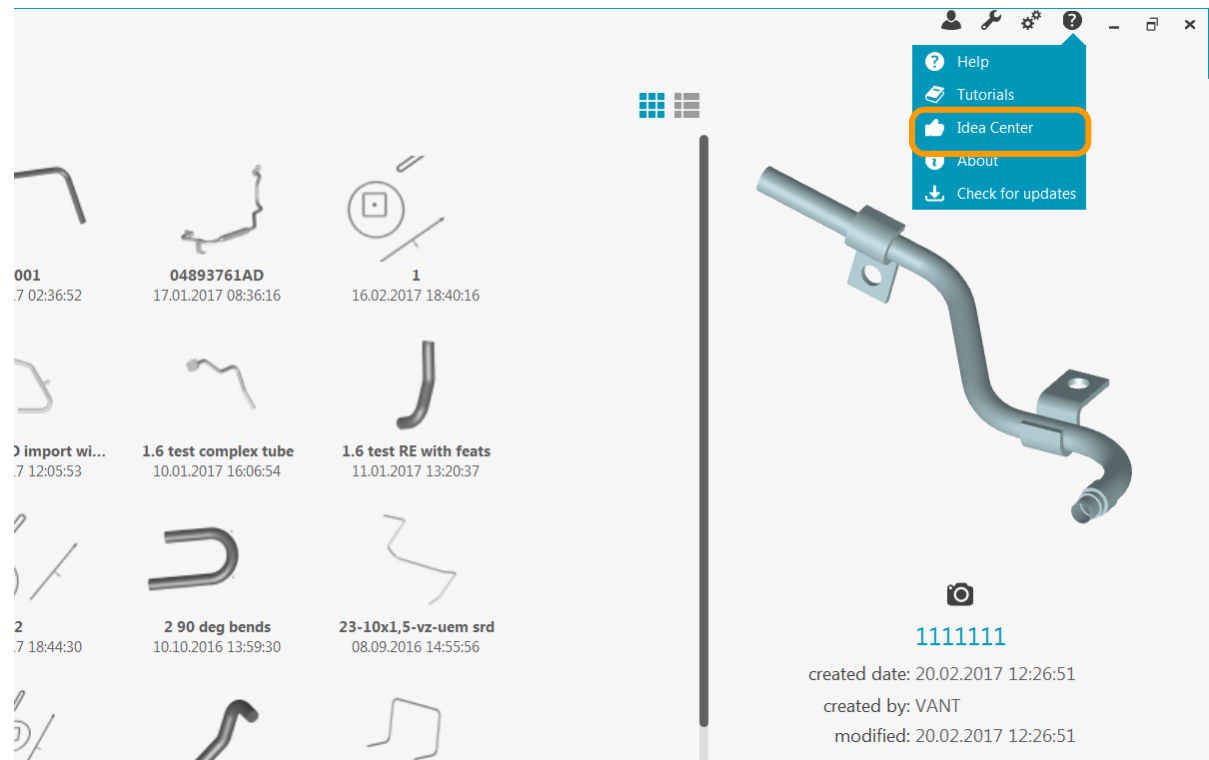
**Editing the CLRA values can create a safety hazard!**

**If the CLRA values are edited without careful checks, and then sent to the bender, a tube could be made that will damage the tube, the bender or the environment. It may even harm the operator.**

**DO NOT edit CLRA values without checking them first.**

# TubeShaper v1.6

- TubeShaper v1.6 has the following new functions:
  - **Idea Center:** If you have an idea for a new function or enhancement that can be added to TubeShaper, just click on the 'Idea Center' command in the Help section (internet connection required).





# TubeShaper Release v1.5

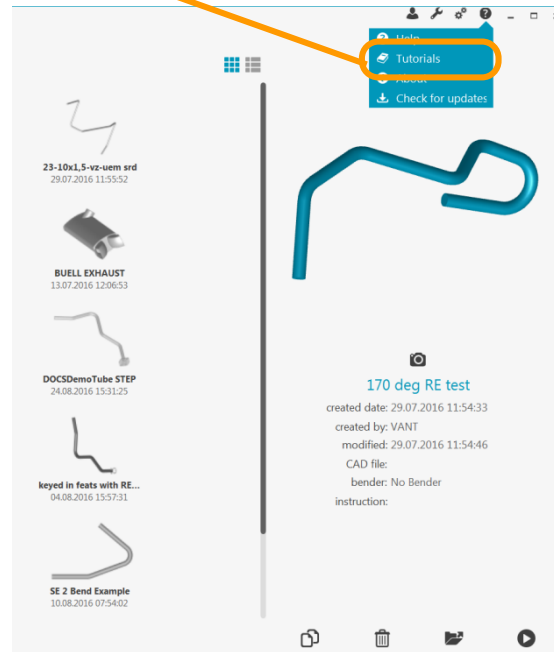
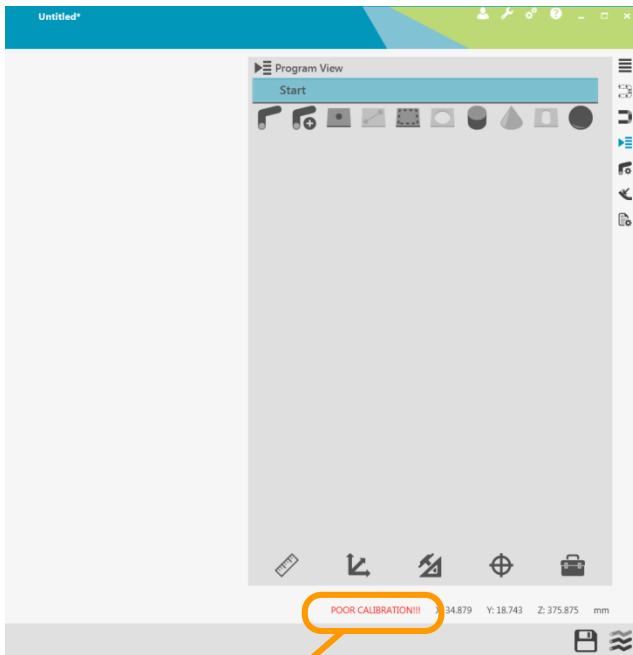
---

17<sup>th</sup> October 2016



# TubeShaper Release v1.5: What's New?

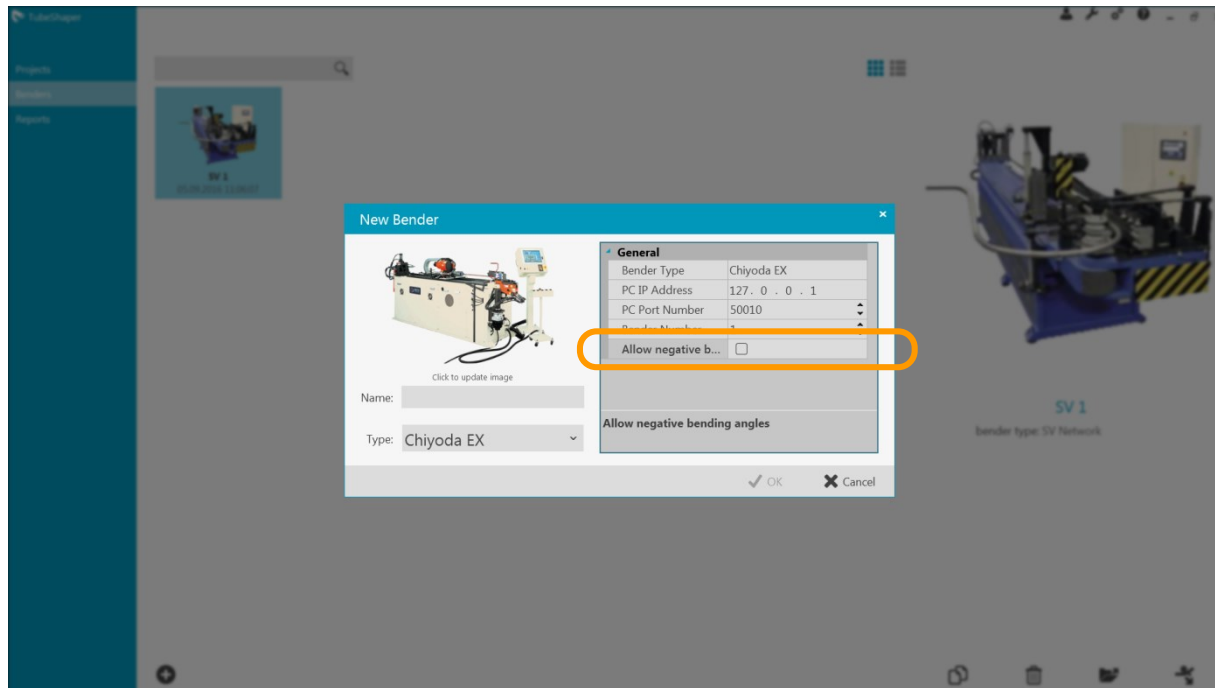
- TubeShaper v1.5 has the following new functions:
  - **All new tutorials:** the most recent tutorials are now always included in new versions of TubeShaper. Please use them as much as possible. Click on the 'help' icon and then 'Tutorials' to find them (see image below).



- **Calibration warning:** this is an error message that is shown if the Tube Probe calibration is not present, or has poor results. The probe should be re-calibrated on the T-Bar.

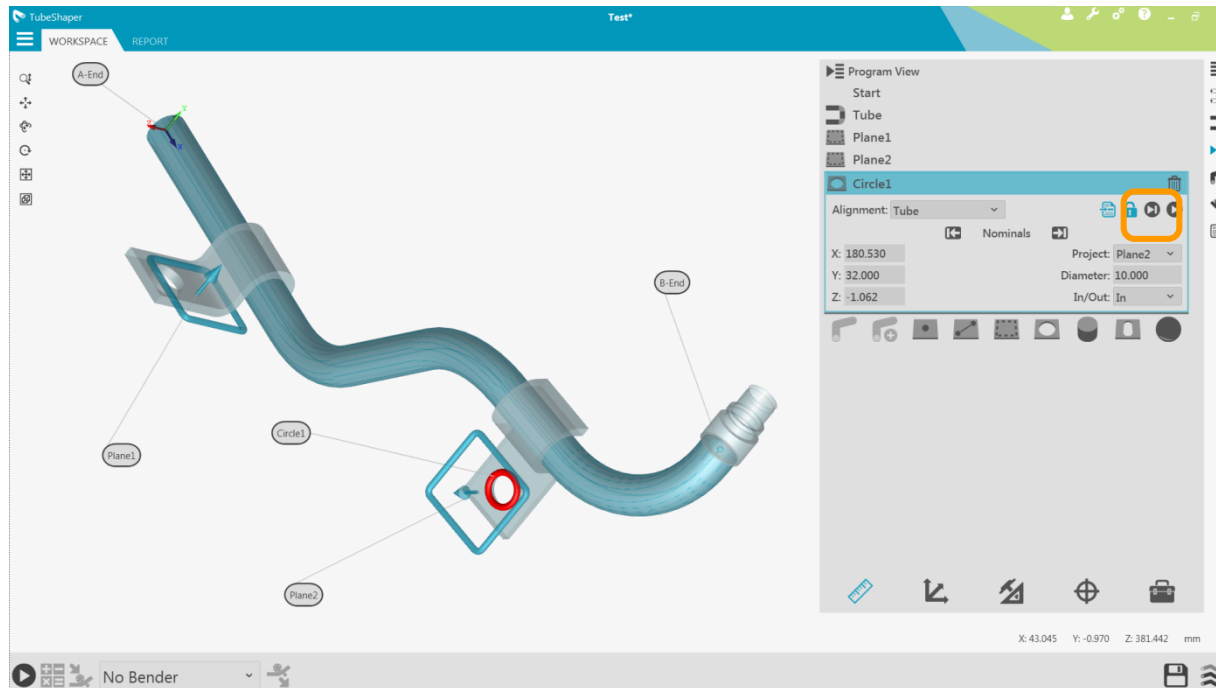
# TubeShaper Release v1.5: What's New?

- TubeShaper v1.5 has the following new functions:
  - **Negative bend angles:** Following market feedback we have received, TubeShaper now supports negative bend angles on all benders. This is a checkbox in the bender set up menu which can be activated if necessary (it is off by default).



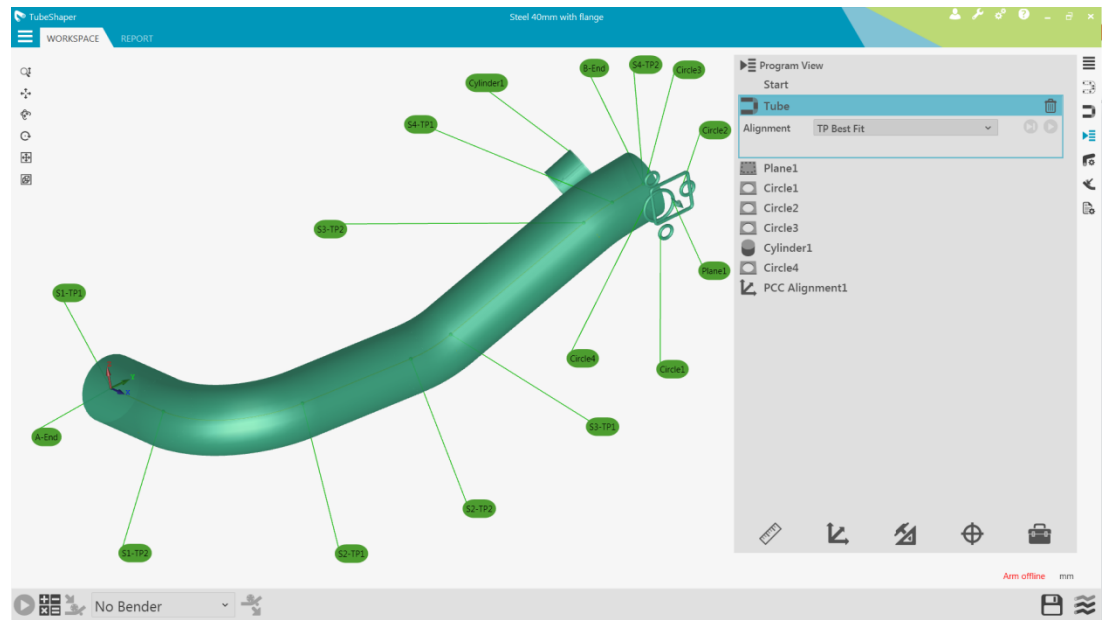
# TubeShaper Release v1.5: What's New?

- TubeShaper v1.5 has the following new functions:
  - **Measure single features as part of a measurement program:** Sometimes you don't want to run a whole measurement program, so we have implemented an icon to allow you to measure a single feature.



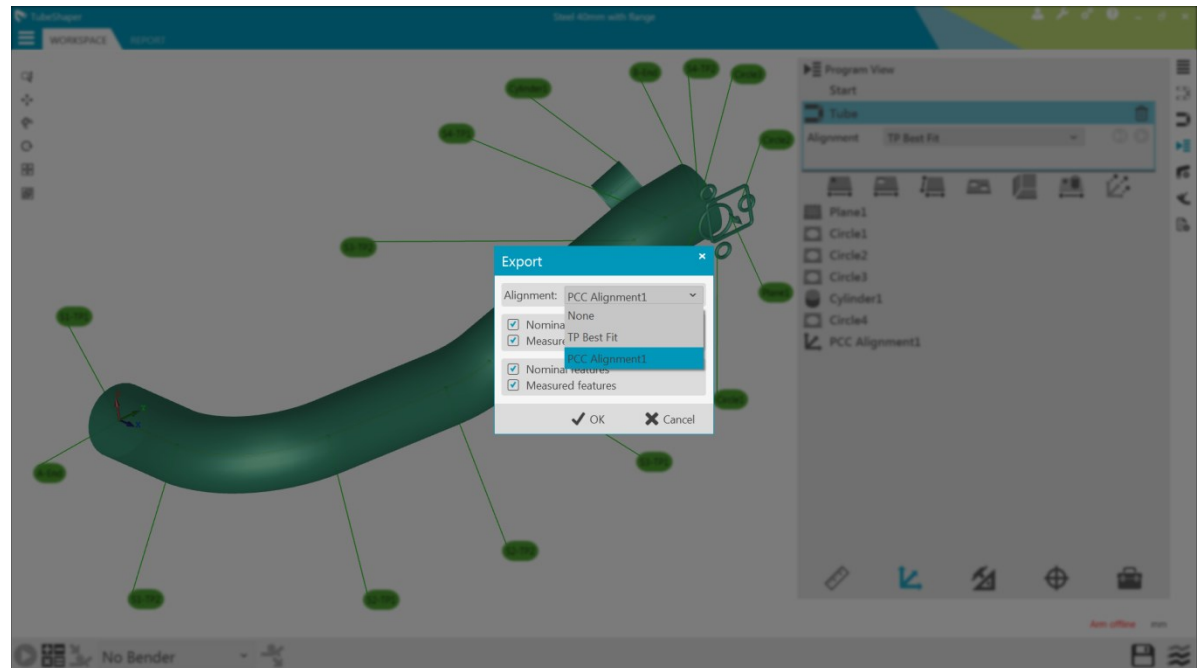
# TubeShaper Release v1.5: What's New?

- TubeShaper v1.5 has the following new functions:
  - **Alignment picker for exporting tubes and features:** this makes it easier to export assemblies in the aligned position that you want.
  - **180° bend improvement:** 180° bends can now be managed as single bends, not as two bends of 90° with a '0' length straight between them.



# How Does the Alignment Picker Work?

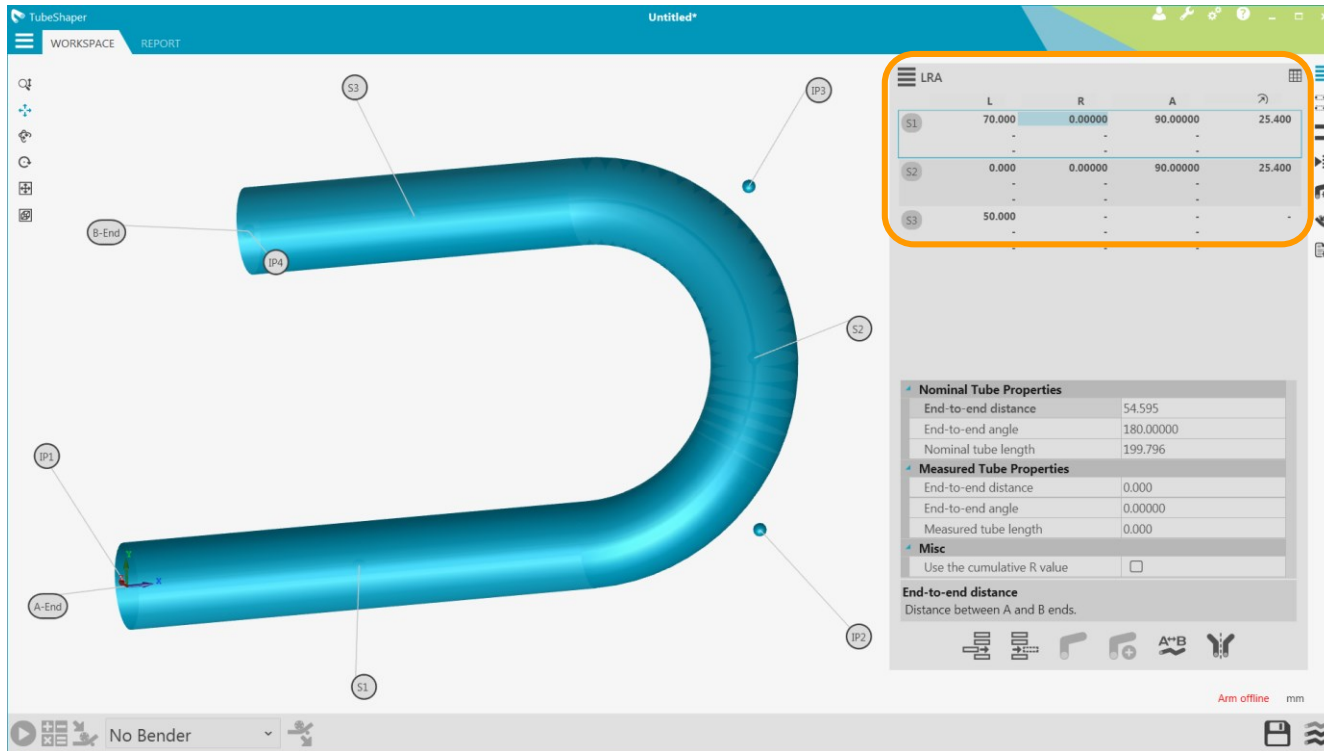
- If you have a project that contains a feature-based alignment (plane-circle-circle, plane-line-line, plane-plane-plane and so on), you can now choose in which alignment you want to export it.
- Click on the 'save' icon and then 'export CAD.' You can choose the feature-based alignment, or the tube's TP best-fit.
- You don't need to modify the active alignment in the project! This is done automatically when you export.





# How Have 180° Bends Been Improved?

- Previously, 180° bends were managed by inserting a theoretical straight into the middle of a bend, creating 2 separate bends of 90°. The length of this theoretical straight was '0' like you see here:



- The problem with this method was that tube benders consider this as **two separate bending operations**. This causes a loss of accuracy in the bender process (the tube twists, because the bender clamps on to the tube twice).

# How Have 180° Bends Been Improved?

- TubeShaper v1.5 now handles 180° bends as just **one single bend**, not two 90° bends.
- If you key-in or import a tube with a 180° bend you will see this. When you measure the tube, you will be asked to measure the bend, but no longer the '0 straight.'

The screenshot shows the TubeShaper software interface. The main workspace displays a 3D model of a blue tube with a 180-degree bend. The tube is labeled with 'A-End' at the top and 'B-End' at the bottom. The bend is labeled 'S1-TP1' and 'S1-TP2'. The workspace also shows 'S2-TP1' and 'S2-TP2' labels. The report panel on the right is titled 'YBD' and contains a table with the following data:

	L	R	A	
S1	166.149	0.00000	180.00000	152.000
S2	180.355	-	-	-

Below the table, the report panel shows 'Nominal Tube Properties' and 'Measured Tube Properties'.

**Nominal Tube Properties**

End-to-end distance	304.332
End-to-end angle	180.00000
Nominal tube length	824.026

**Measured Tube Properties**

End-to-end distance	0.000
End-to-end angle	0.00000
Measured tube length	0.000

**Misc**

Use the cumulative R value

**End-to-end distance**

Distance between A and B ends.

The status bar at the bottom shows 'No Bender' and coordinates: X: 14.820 Y: 26.445 Z: 479.585 mm.

- This gives us a **significant advantage**.



# TubeShaper Release v1.4

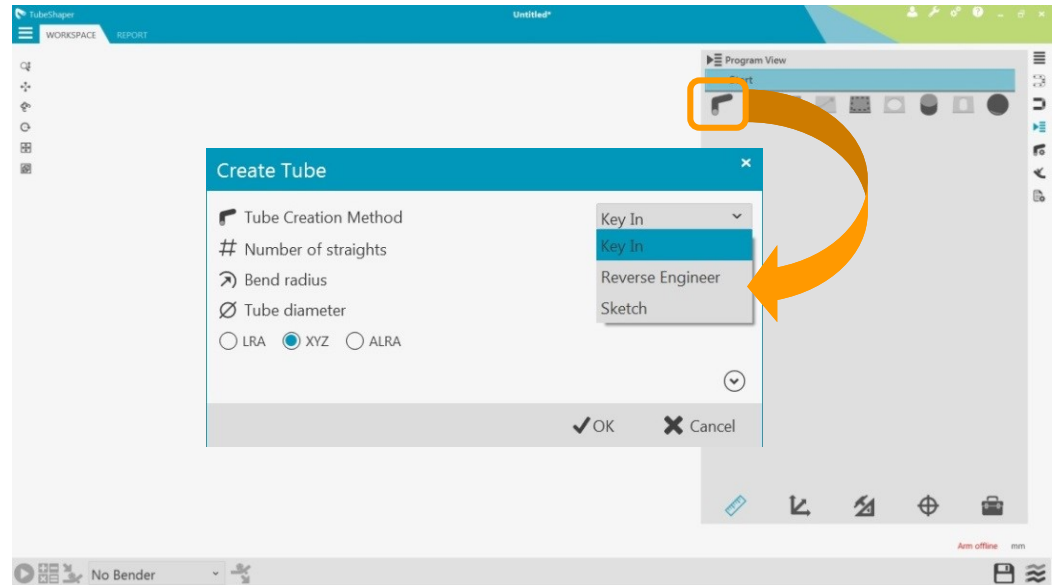
---

24<sup>th</sup> June 2016



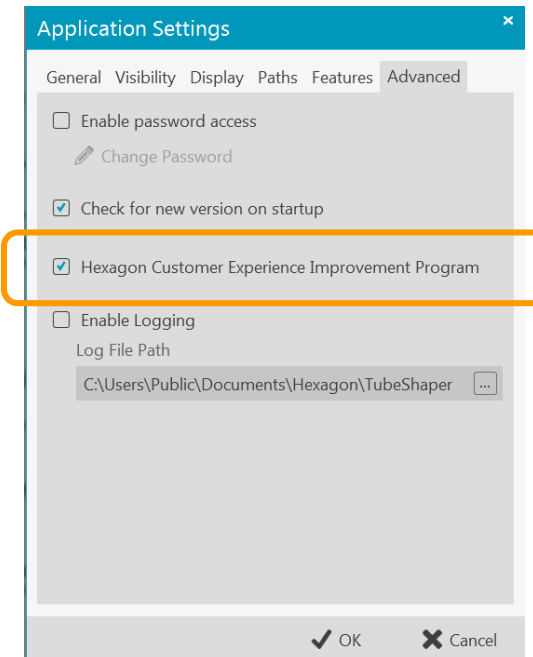
# TubeShaper Release v1.4: What's New?

- TubeShaper v1.4 has the following new functions:
  - **3 new bender interfaces:** Chiyoda, COMCO and Silfax.
  - **A new dialog for creating new tubes.** You should go to the Program View, and then the Feature Creation bar. See image below, or new tutorials (inside TubeShaper).
  - **'Sketch':** allows you to create a virtual tube, by digitising points with the touch probe.

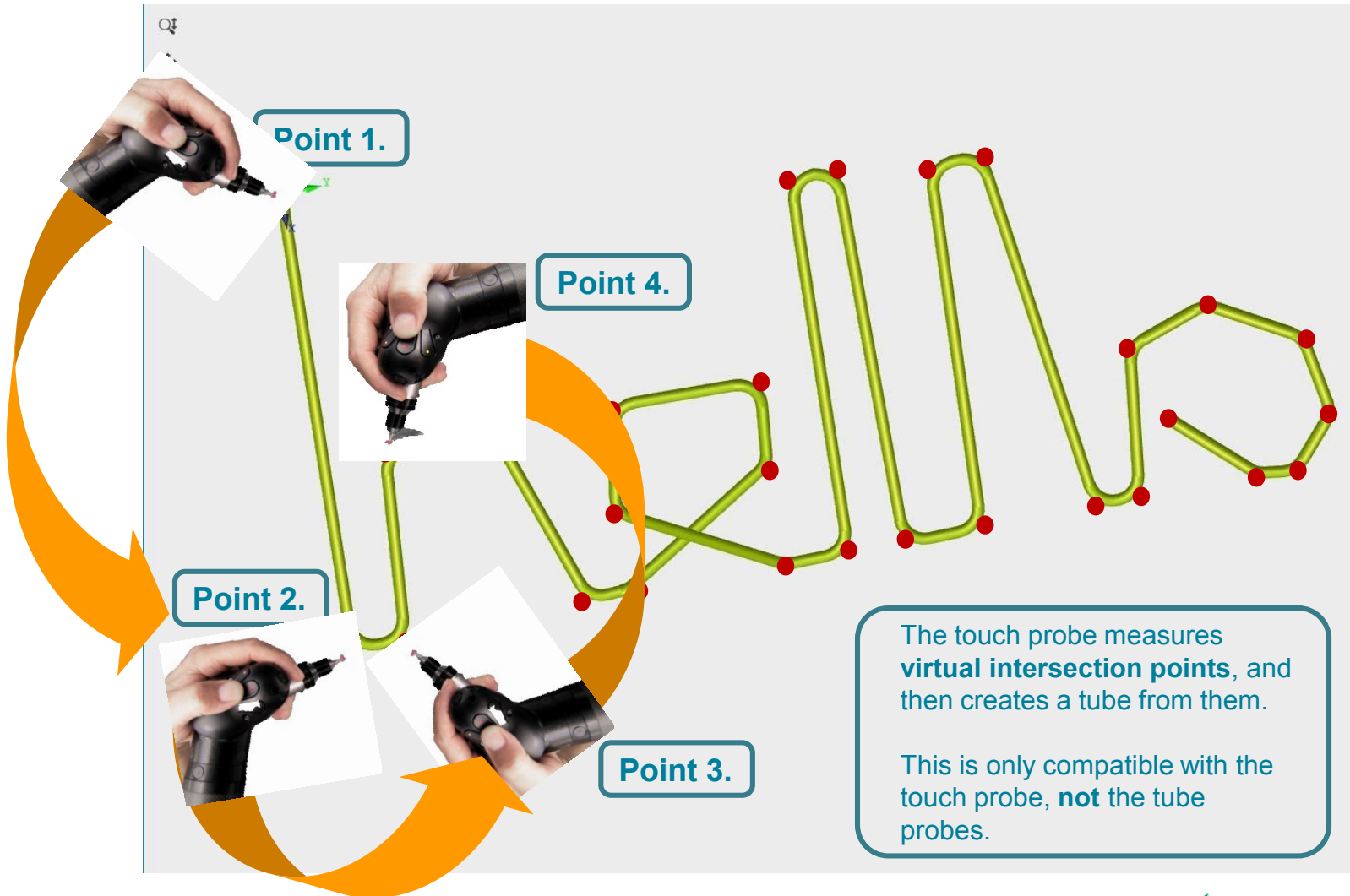


# TubeShaper Release v1.4: What's New?

- TubeShaper v1.4 has the following new functions:
  - **Automatic report creation.** This allows you to automatically create and export a report **every time you measure a tube**. You can activate this inside the Project Properties.
  - **Middle points** (MP's) and **labels** are now shown in the reports.
  - **Hexagon Customer Experience Improvement Program** is a new feature to several software products. It sends vital information back to us as a log file, so we can analyse better how the software is used. It only functions if the PC is connected to the internet, and **can be deactivated at any time** (via the Application Settings).



# How Does The Sketch Function Work?



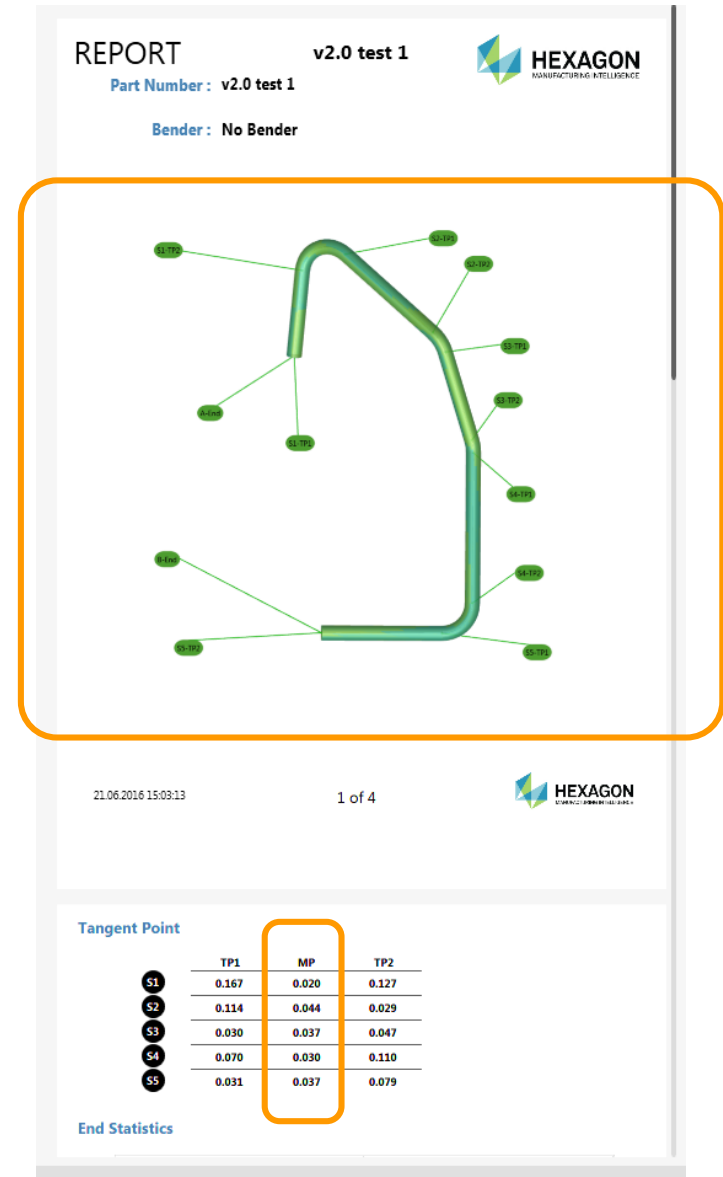
# Automatic Report Creation

- If the checkboxes are activated in the Report Options section of the Project Properties, a report will be saved and/or exported as pdf or csv every time you measure a tube.
- You can decide where to export the reports to by going to the 'paths' section of the Applications Settings.

The screenshot displays the TubeShaper software interface. On the left, the 'Application Settings' dialog is open, with the 'Paths' tab selected. The 'Reports path' field is highlighted with an orange box, showing the path 'C:\Users\Public\Documents\Hexagon\TubeShaper\Reports'. In the center, a 3D model of a green tube is shown with several measurement points labeled IP1 through IP6. On the right, the 'Project/Tube Properties' panel is open, with the 'Report Options' section highlighted by an orange box. This section contains three checkboxes: 'Auto Create Report' (unchecked), 'Auto Create Report CSV' (unchecked), and 'Auto Create Report PDF' (checked). Below this, the 'General' and 'Physical Properties' sections are visible, showing various parameters like 'Tube diameter' (14.945) and 'Wall thickness' (0.000). At the bottom of the properties panel, the 'Auto Create Report PDF' section is expanded, showing the text 'PDF Report will be automatically created after measurement'.

# New Reports

- Labels and Middle Point (MP) errors are now available in the report.
- We suggest that you position the tube vertically in the workspace, to fit the 'portrait' format of the final report.







**HEXAGON**  
MANUFACTURING INTELLIGENCE

Thanks for your attention

