

# General Workflow

In this tutorial, we look at the **General Workflow** for using ATOMS Precision. The aim of this tutorial is to give an overview of the software with reference to more detailed tutorials in the tutorial series. There are 4 basic steps on the workflow when using ATOMS Precision:

STEP 1: Working with images;

STEP 2: Creating Templates;

STEP 3: Validation;

STEP 4: Reports.

You should be familiar with the Atoms Precision V2 user interface before continuing with this tutorial.

### STEP 1 : WORKING WITH IMAGES

The **Step 1** in the workflow to put it simply is to get a graphic image of the object into the software. This becomes the Working Image. STEP 1 uses the commands in the **START Tab**. There are 3 different ways we can use for Step 1.

The 1st method is by importing a scanned image of the object using bmp, jpeg, png and tiff. Here we select a jpeg file of a plate as shown in figure 1.

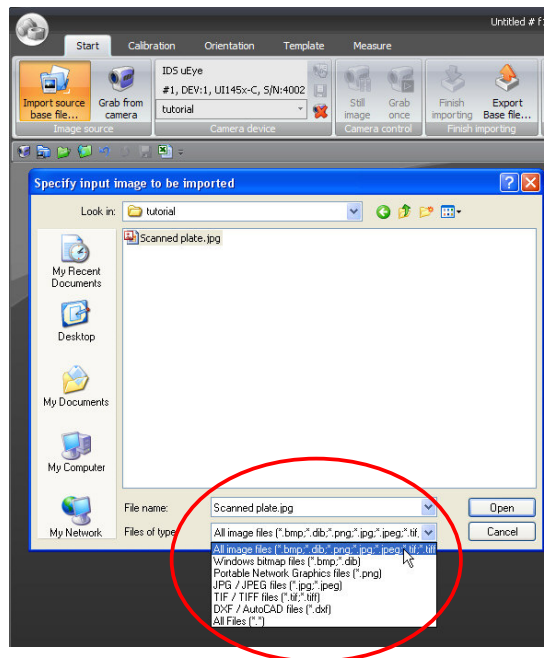



Figure 1

The second method uses a camera attached to a computer to take a snapshot of the object by clicking on the camera icon  at the Measurement Lights panel.

The third method is by importing an AutoCAD DXF. Here I select a DXF file of this plate file as shown in figure 2.

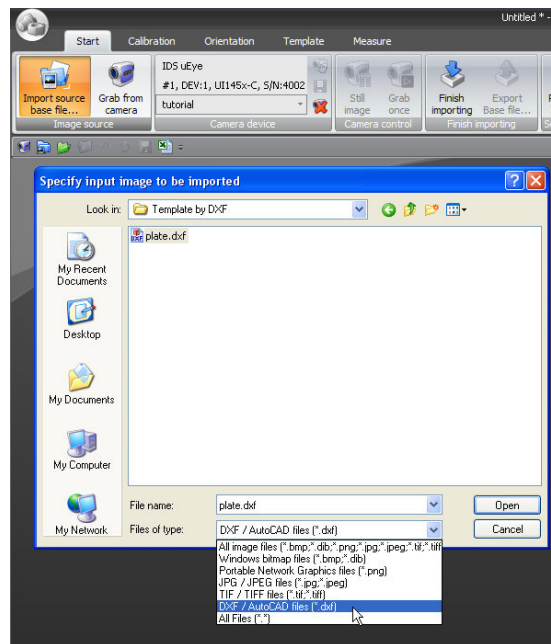


Figure 2

Please refer to the relevant tutorials in the series to learn more about the individual methods.

## STEP 2 : CREATING TEMPLATES

Once we have a working image, we move to Step 2 which includes calibration, orientation, additional geometry and measurements. The first thing to do is to calibrate the image using commands from the **Calibration Tab**.

Calibration is a necessary procedure for images we get from a scanned file or directly from a camera to scale the image to match the real object's size. No calibration is needed when working with DXF files since the geometry is already correctly scaled.

In this example the diameter of the circle was initially about 1.57 mm (as shown in figure 3) before the image was calibrated.

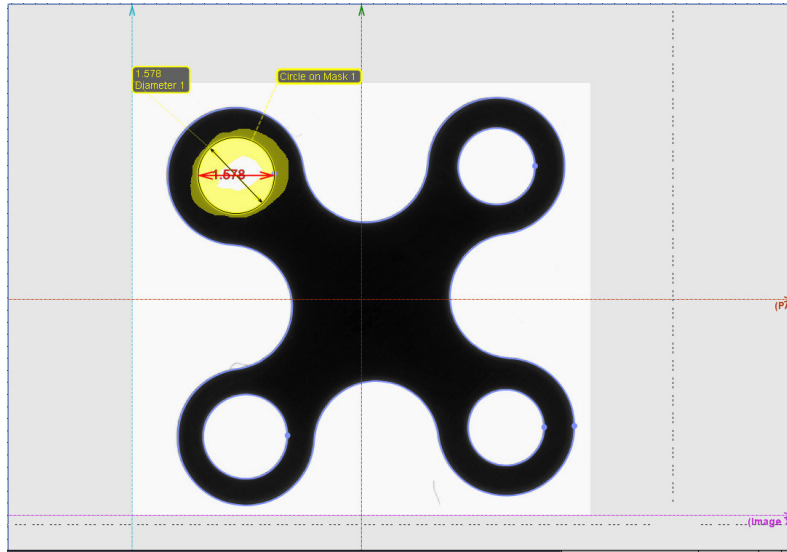


Figure 3

After loading the appropriate **Optical Device Profile** which stores the calibration data, the dimension was corrected to the actual size of 2.5mm (as shown in figure 4).

To learn how to perform calibration, see the tutorial on Calibration.

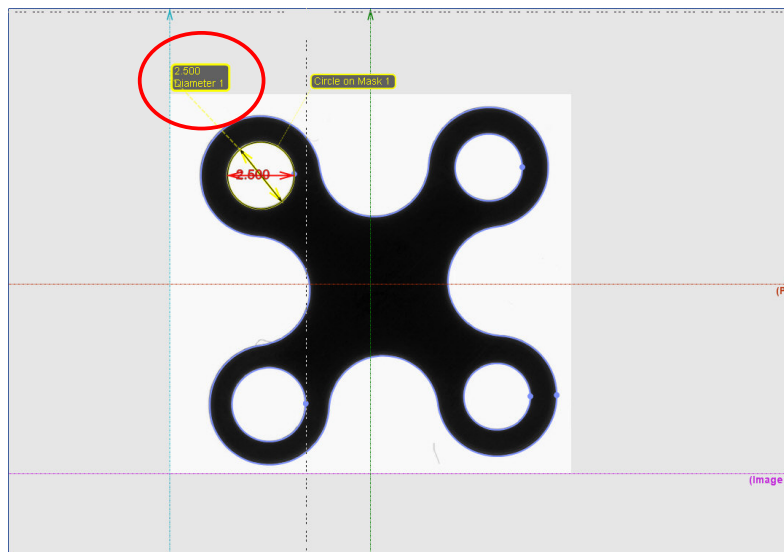


Figure 4

The values of the Pixel size can be saved to an Optical Device Profile and used for future as shown in figure 5. For more info, see the tutorial on Calibration.

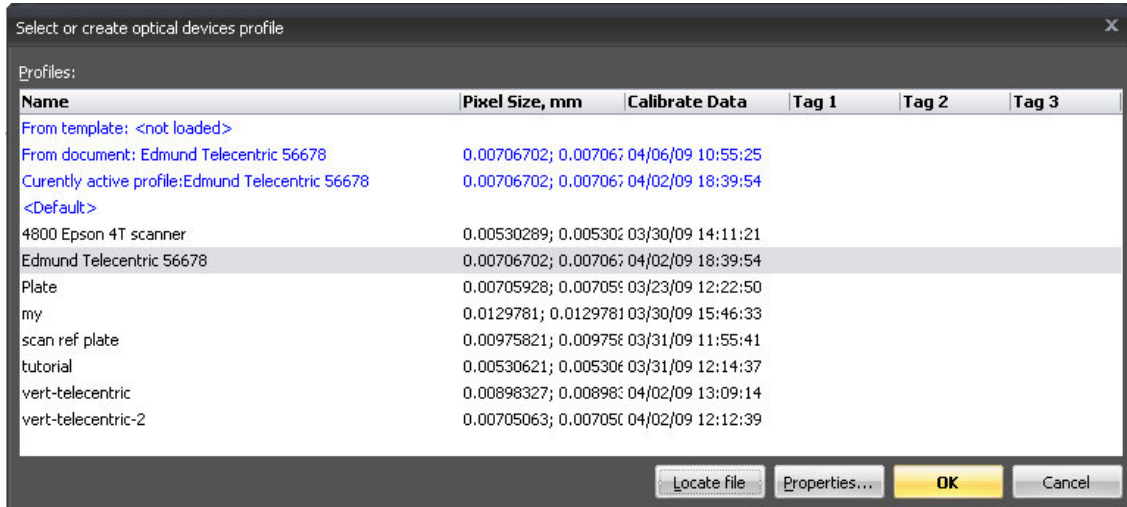


Figure 5

### Tips on Calibration

1. Using a DXF file will be ideal as no calibration is necessary and is most accurate.
2. Use an accurate calibration aid like the one shown in figure 6 is a commercially available.
3. Calibration is required to redo if the camera's focus, zoom, aperture or backlight have changed.



Figure 6

After Calibration, we set the **Orientation** of the template ensuring correct positioning and alignment of the template to the object to be inspected. This step uses the commands from the **Orientation Tab** to create geometry objects like lines, circles and points as shown in figure 7.

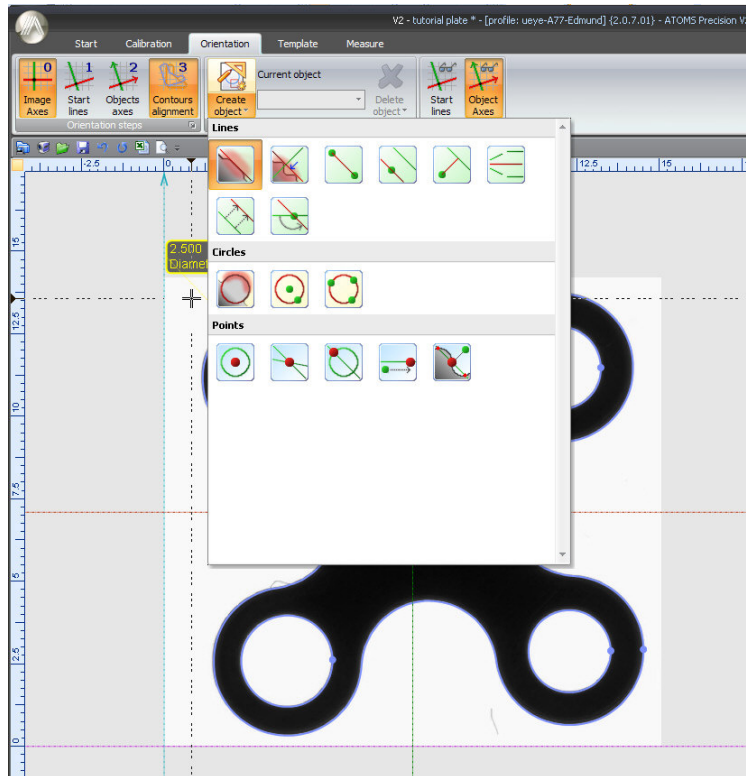


Figure 7

We recommend using the default option of **Contours Alignment**. The other options of Objects Axes and Start Lines are used for advance applications only and may require the user to create geometry objects like lines, circles and points. For more info, see the tutorial on Orientation.

After Orientation, we can proceed to create additional **Geometry** to help us with the measurements creation for the next stage. Geometry can be created in the **Orientation** or the **Template Tabs** where we can create geometry by masking. Here we create a circle at this hole by masking is shown in figure 8 (Please see next page).

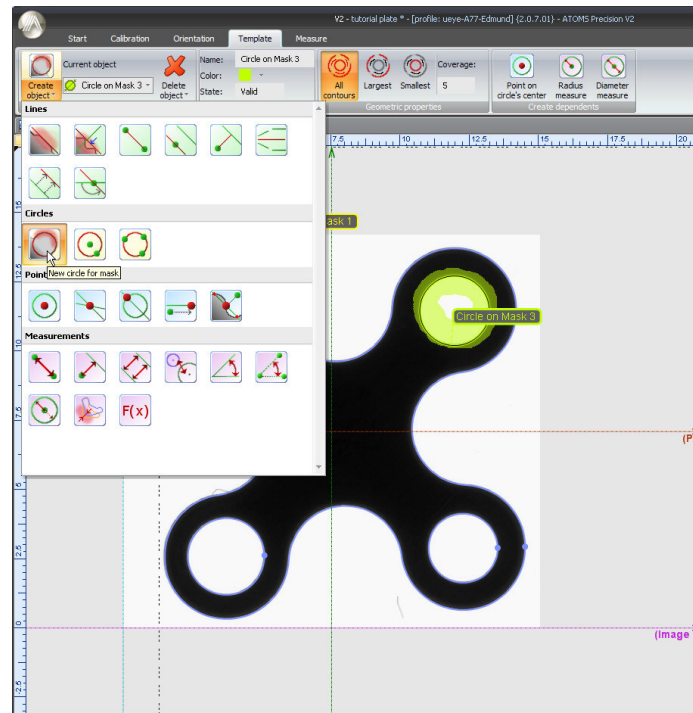



Figure 8

Any incorrectly masked area can be erased easily by using the Erase Tool . The tutorial on **Create Geometry Objects** shows how geometry can be created in more detail.

Once we have all the required geometry, we can proceed to create the **Measurements** in the **Template Tab**. We can create lines, angles, radii, diameters and distances between contour measurements. Once created these measurements form the basis from which objects to be validated is evaluated. Shown in figure 9 is the diameter measurement command.

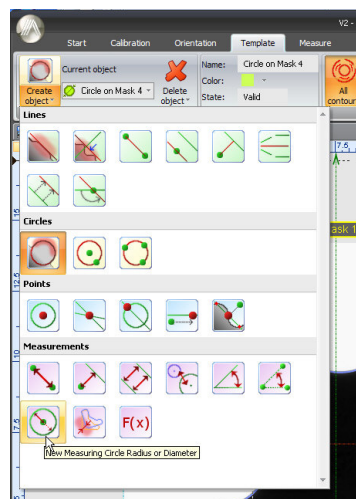


Figure 9

Measurements are evaluated based on the tolerance specified. Tolerance has to be given for each measurement. Shown in figure 10 is an example of specifying tolerance for a Diameter Measurement where we need to key-in the expected dimension, the left and right tolerance values which also mean the lower and upper tolerances.

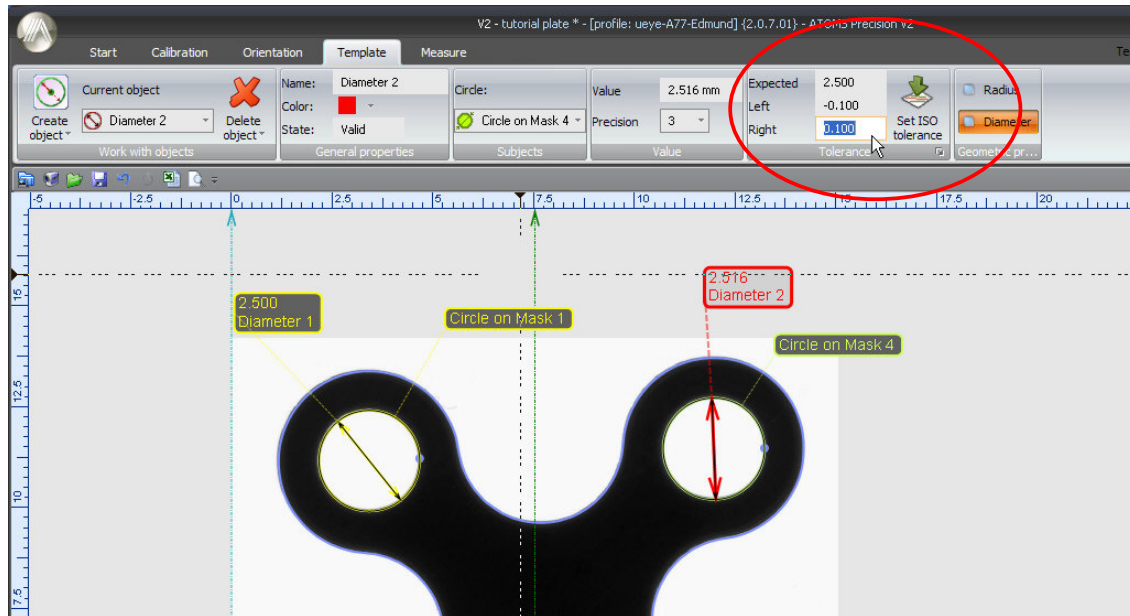


Figure 10

Alternatively we can use the ISO tolerance which has the tolerance values (based on ISO) built-in into ATOMS Precision. This makes it very convenient for the user if he needs to use the ISO standards. Tolerance values based on ISO standard and *Tolerance Class* are automatically retrieved and filled into the **Left** and **Right** values in the Tolerance panel when the **Set ISO Tolerance** has been selected. These values can be changed if required. The *Tolerance Class* can be selected from the **Document Properties** panel as shown in figure 11.

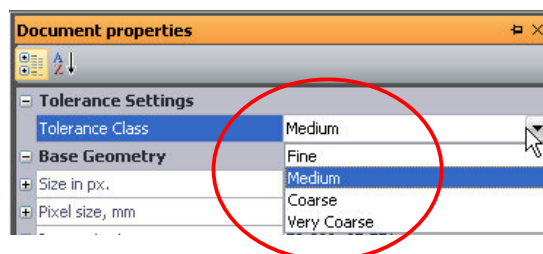


Figure 11

We see the diameter measurement example with its tolerances as listed in the Measurement panel as shown in figure 12.

Name	Visibility	Current value	Validity	Expected value	Left tol...	Right tol...	Unit
Diameter 2		2.516		2.500	-0.100	0.100	mm

Figure 12

The tutorial on **Create Measurements Objects** shows how to create measurements. We have a tutorial showing of 2 examples of how you can create a template from scratch.

### STEP 3 : VALIDATION

After creating the template, we proceed to Step 3 which can be performed by an operator to validate the manufactured parts with the template. We use the **Measure Tab** for this purpose. We first import the image of the object into ATOMS Precision by using the **Import Source Base File** or **Grab from Camera** commands. We then load a template which we have created for this object. The tutorial on Applying Template will show you how to use the **Load Template** and **Apply Template** commands.

At times we may need to make additional measurements “on the fly” such as distance between 2 objects as shown in figure 13.

This can be done by using the commands in the **Quick Measure Toolbar** without the need for masking. The tutorial on **Quick Manual Measurements** will show you how to use these commands.

The validation step will determine if a manufactured part becomes valid or invalid. The result can be seen on the **Measurement Lights** panel.

A ‘pass’ icon or ‘fail’ icon will appear accordingly.

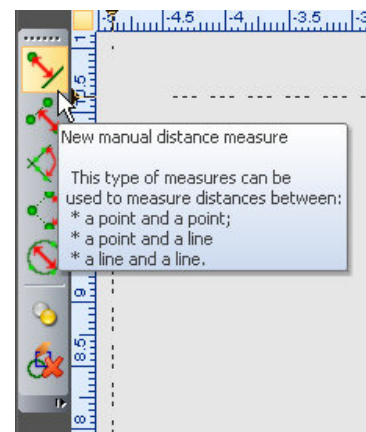


Figure 13

### STEP 4 : REPORTS

The final step, Step 4, describes the types of reports available after validation has been done. To create a report, go to the **Application button / Print Preview / Export** command then select the **Base Report** or the **Multiple Measurement Summary** commands as shown in figure 14.

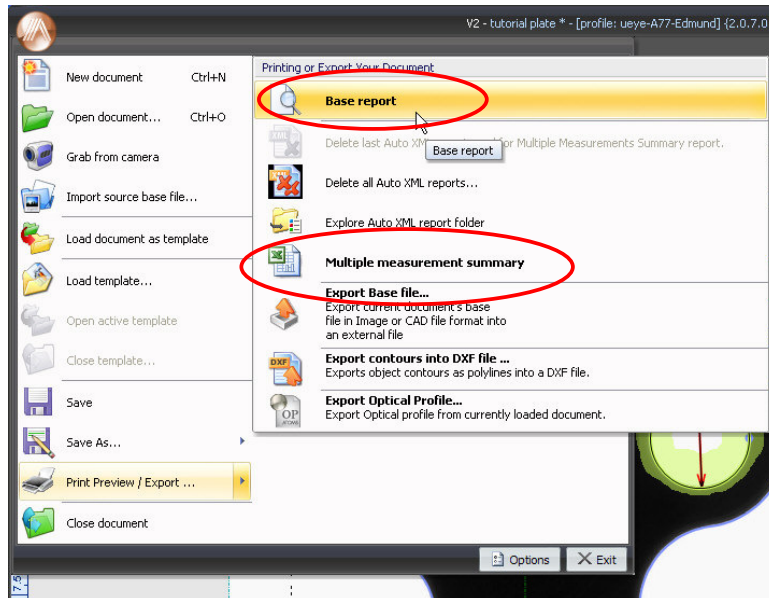


Figure 14

A Microsoft Excel file is generated automatically after the **Multiple Measurement Summary** command is clicked. A summary report can be created when some measurements have been done. A sample summary report is shown in figure 15.

#	Import/Capture File name	Distance 1(IN)	Distance 1(OUT)
1	10:33:35	-0.040	0.013
2	10:34:08	-0.047	0.016
3	10:34:54	-0.044	0.020
4	10:35:29	-0.037	0.016
5	10:36:11	-0.040	0.016
6	10:36:34	-0.042	0.015
7	10:37:11	-0.045	0.019
8	10:37:52	-0.039	0.011
9	10:38:21	-0.027	0.028
10	10:39:12	-0.048	0.014
11	10:39:33	-0.039	0.013
12	10:39:51	-0.054	0.019
13	10:40:25	-0.059	0.010
14	10:40:53	-0.045	0.013
15	10:41:26	-0.032	0.023
16	10:41:47	-0.046	0.014
17	10:42:03	-0.050	0.004

Figure 15

For a detailed look at reports, please see the tutorial on **Creating Inspection Reports**.

In this tutorial, we gained a brief insight on the overall work flow of Atoms Precision V2. Thanks for viewing this tutorial and please view the other tutorials in this series to learn more about the features of Atoms Precision V2.

