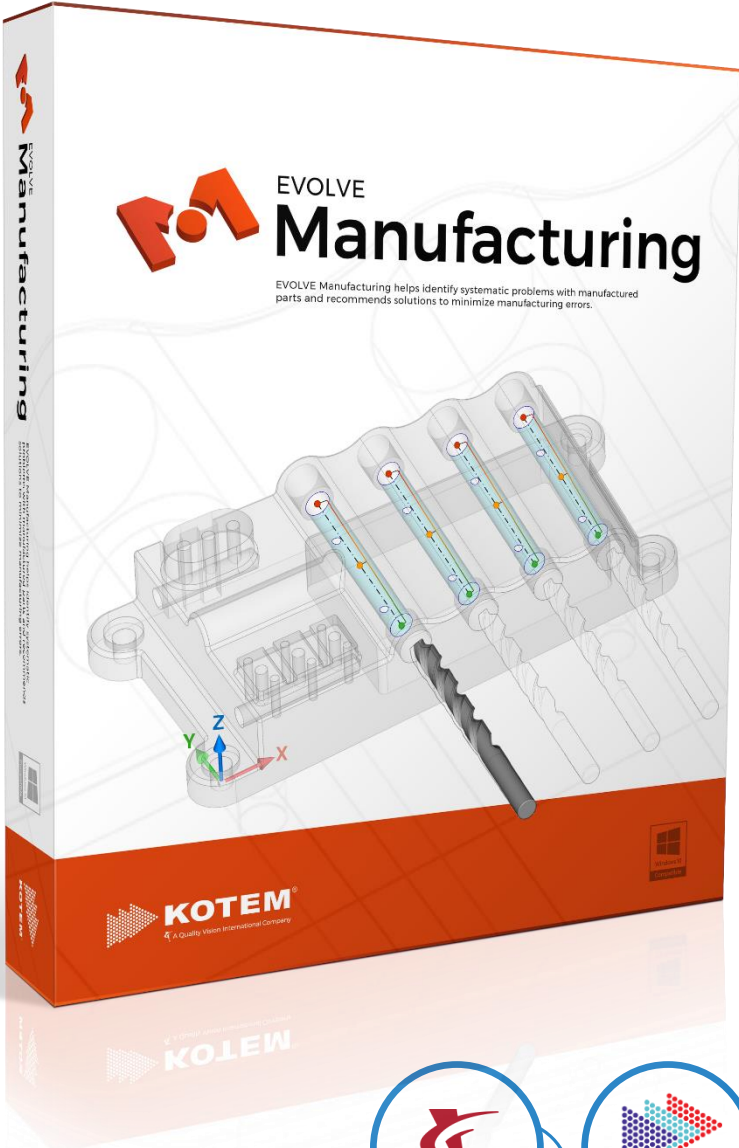


# What's new in EVOLVE Manufacturing 6.0?





# Manufacturing Characteristics

Ability to create Manufacturing Characteristics (manufacturing tolerances) in order to control the manufacturing process and see if any interaction is needed.

| Name                          | Results | Nominal | Actual  | USL | LSL  | Type |
|-------------------------------|---------|---------|---------|-----|------|------|
| Set Values for selected rows: |         |         |         |     |      |      |
| Cylinder001 DIAM              |         | ø25     | ø24.866 | 0.1 | -0.1 | ↔    |
| Cylinder001 FORM              |         | 0       | 0.088   | 0.1 | -    | ⚠    |
| + Cylinder001 PTOL            |         | 0       | 0.175   | 0.1 | -    | ⊕    |
| Cylinder002 DIAM              |         | ø16     | ø15.863 | 0.1 | -0.1 | ↔    |
| Cylinder002 FORM              |         | 0       | 0.066   | 0.1 | -    | ⚠    |
| + Cylinder002 PTOL            |         | 0       | 0.252   | 0.1 | -    | ⊕    |
| Surface001 FORM               |         | 0       | 0.06    | 0.1 | -    | ⚠    |
| Surface001 OFFSET             |         | 0       | 0.082   | 0.1 | -0.1 | ↔    |
| Surface001 PROF               |         | 0       | 0.229   | 0.1 | -    | ⊕    |
| Surface003 FORM               |         | 0       | 0.021   | 0.1 | -    | ⚠    |
| Surface003 OFFSET             |         | 0       | -0.002  | 0.1 | -0.1 | ↔    |
| Surface003 PROF               |         | 0       | 0.035   | 0.1 | -    | ⊕    |



# Simulation

The new **Simulation** function helps to find the Manufacturing correction values which makes the functional part correct, i.e. it minimizes the results of the GD&T/GPS tolerances.



Simulations

Simulation list

Original (LS criterion)

ALIGNMENT 1 Machine CSYS

|               | Translate               | Rotate       | Offset |
|---------------|-------------------------|--------------|--------|
| A Plane001    | TZ: -0.076              |              |        |
| B Plane002    | TY: -0.074              |              |        |
| D Cylinder001 | TX: -0.064<br>TY: 0.042 |              |        |
| E Cylinder002 | TX: -0.113              |              |        |
| OP3           |                         |              | 0.068  |
| OP4           | TX: -0.826<br>TY: 0.627 |              |        |
| OP4           |                         | RZ: -2.98754 |        |
| OP6           |                         |              | 0.082  |

Compared results of the Original and Simulated GD&T tolerances are shown.

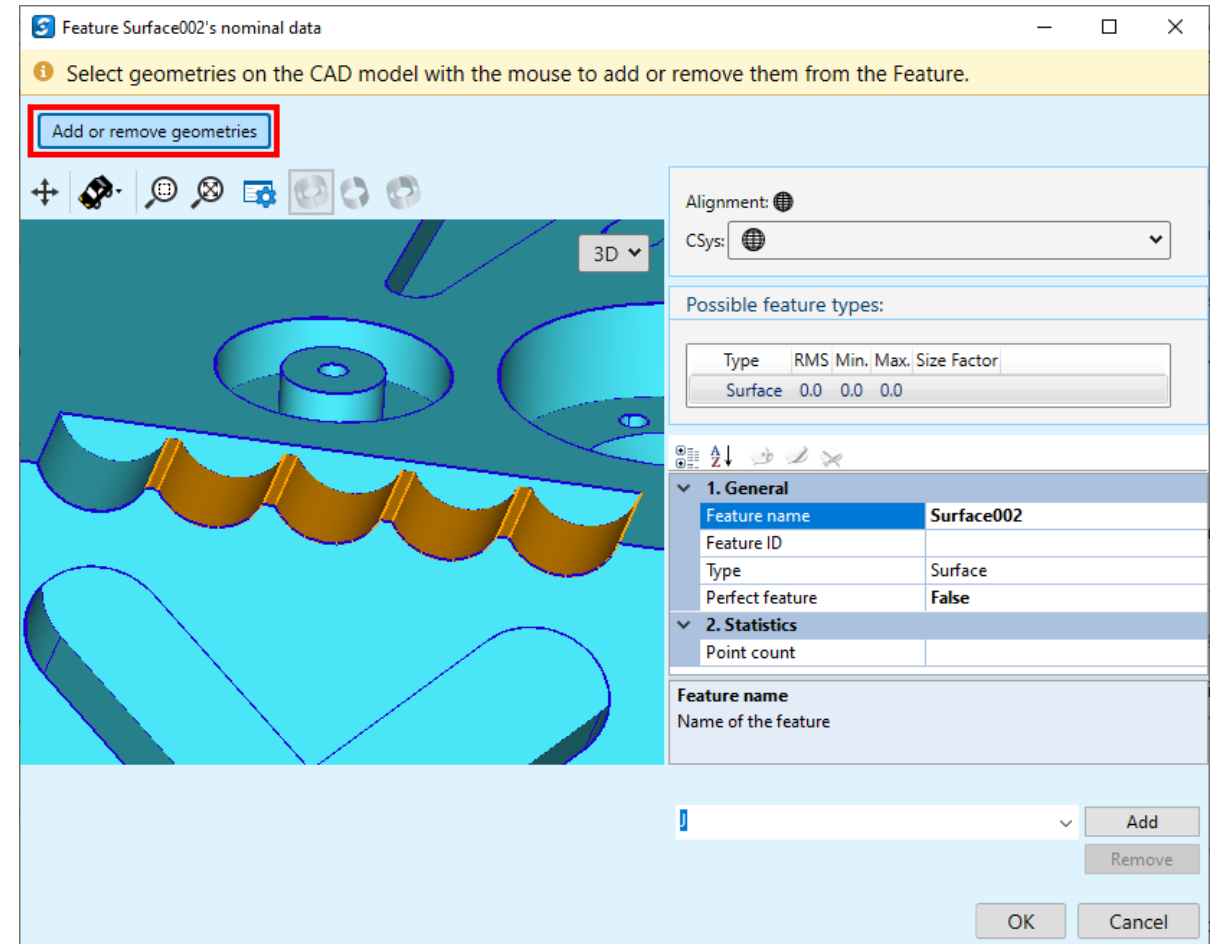
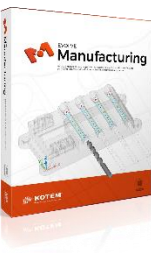
Summary

| Item          | Original                | Simulated     | Change                    | Percentage                  | Criteria |
|---------------|-------------------------|---------------|---------------------------|-----------------------------|----------|
| D Cylinder001 | $\phi 25 \pm 0.15$      | $\phi 24.866$ | $\rightarrow \phi 25.002$ |                             | LS       |
| E Cylinder002 | $\phi 16 \pm 0.08$      | $\phi 15.863$ | $\rightarrow \phi 15.999$ |                             | LS       |
| SEP REQ       | 0.1                     | 0.269         | $\rightarrow$ 0.066       | (202.2%)                    | #1 LS    |
| SEP REQ       | $\phi 0.05 \text{ (M)}$ | $\phi 2 - 6$  | $\rightarrow$ 0.041       | $\rightarrow$ 0.007 (55.8%) | D (M)    |
| SEP REQ       | $\phi 0.05 \text{ (M)}$ | $\phi 0.12$   | $\rightarrow$ 0.019       | (224.9%)                    | A D (M)  |
| SEP REQ       | $\phi 0.1 \text{ (M)}$  | 0.265         | $\rightarrow$ 0.033       | (215.8%)                    | A B C    |
| SEP REQ       | $\phi 0.05 \text{ (M)}$ | 0.027         | $\rightarrow$ 0.027       | (-1.1%)                     | A        |
| SEP REQ       | $\phi 0.1 \text{ (M)}$  | 0.265         | $\rightarrow$ 0.033       | (215.8%)                    | A B C    |
| SEP REQ       | $\phi 0.05 \text{ (M)}$ | 0.027         | $\rightarrow$ 0.027       | (-1.1%)                     | A        |
| 3X            | $\phi 0.03 \text{ (M)}$ | 0.719         | $\rightarrow$ 0.005       | (786.3%)                    | A C      |
| SEP REQ       | 0.05                    | 0.154         | $\rightarrow$ 0.046       | (215.7%)                    | A C      |
| SEP REQ       | 0.03                    | 0.123         | $\rightarrow$ 0.028       | (314.9%)                    | A        |
| SEP REQ       | 0.05                    | 0.001         | $\rightarrow$ 0.004       | (-6.0%)                     | A        |
| SEP REQ       | 0.15                    | 0.279         | $\rightarrow$ 0.128       | (101.0%)                    | E        |



# Feature manipulation

The existing features can be edited by adding or removing CAD geometries.

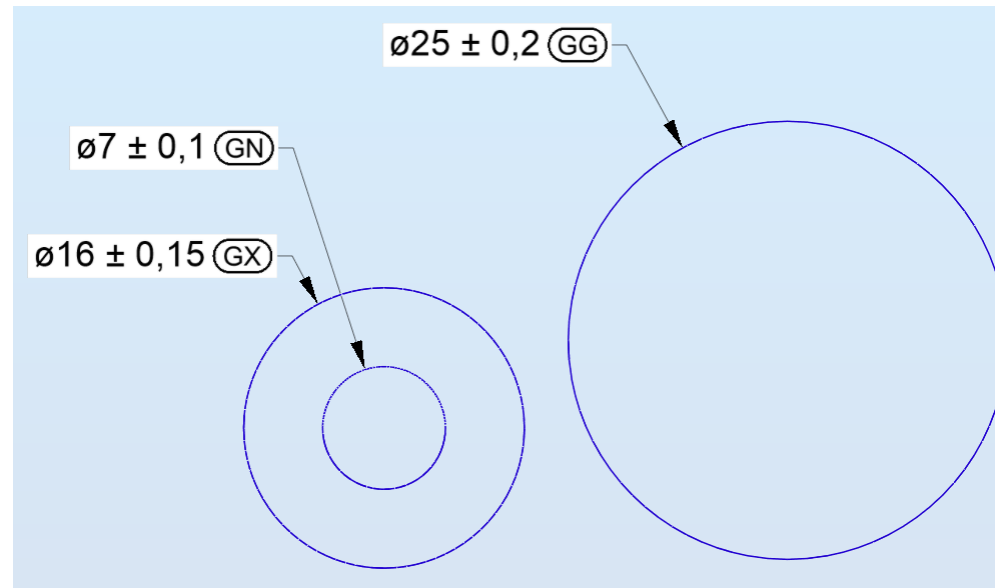


# ISO 1101 improvements



Supporting ISO association symbols for size tolerances:

- $\textcircled{GG}$  - **Least-squares** association criterion
- $\textcircled{GX}$  - **Maximum inscribed** association criterion
- $\textcircled{GN}$  - **Minimum circumscribed** association criterion



# General tolerancing

Ability to easily define general tolerances over the non-toleranced CAD geometries.

## General size tolerance:

- Common size tolerance for every non-toleranced size feature regardless of nominal size
- Applying a tolerance table:
  - Tolerance value depends on the nominal size
  - Using default tables of ISO 2768

## General GD&T/GPS tolerance:

General profile tolerance can be defined to all of the non-toleranced geometries



Type: Manual

Size tolerance: 0,25

Minimum: -0,25


Maximum: 0,25

Size tolerance for selected size features

Type: ISO2768-medium + Define new table

| $0,5 < S \leq 3$ | $3 < S \leq 6$ | $6 < S \leq 30$ | $30 < S \leq 120$ | $120 < S \leq 400$ | $400 < S \leq 1000$ | $1000 < S \leq 2000$ | $2000 < S \leq 4000$ |
|------------------|----------------|-----------------|-------------------|--------------------|---------------------|----------------------|----------------------|
| 0,1              | 0,1            | 0,2             | 0,3               | 0,5                | 0,8                 | 1,2                  | 2                    |

General GPS tolerance

 0.1 A B C



# JEITA General tolerance



  
 Add JEITA General Tolerances  
 JEITA GGT

ISO 1101 with JEITA ET-5102 standard is available in v6.0.

JEITA (Japan Electronics and Information Technology Industries Association) ET-5102 is a general tolerancing standard.

Project Settings

- Switch to ASME Y14.5M-1994 standard
- Switch to ASME Y14.5-2009 standard
- Switch to ISO 1101 standard
- Switch to ISO 1101 with JEITA ET-5102 standard**
- Switch to Least Squares (perpendicular point projection)
- Switch to Least Squares (closest point projection)

It allows to define general tolerances over the non-toleranced CAD geometries based on the selected grade.

JEITA GGT Editor

Click Done on the ribbon to add JEITA General Tolerances

Select surfaces on Model or

Datum system:

Grade:

Ignore items based on size

| Grade  | L ≤ 6 | 6 < L ≤ 30 | 30 < L ≤ 120 | 120 < L ≤ 400 | 400 < L ≤ 1000 | 1000 < L ≤ 2000 |
|--------|-------|------------|--------------|---------------|----------------|-----------------|
| GGTG 1 | 0,1   | 0,2        | 0,3          | 0,4           | 0,6            | 1               |
| GGTG 2 | 0,2   | 0,4        | 0,6          | 1             | 1,6            | 2,4             |
| GGTG 3 | 0,4   | 0,8        | 1,2          | 2             | 3              | 4               |
| GGTG 4 | 1     | 1,4        | 2,4          | 4             | 6              | 8               |



# New Constructed features

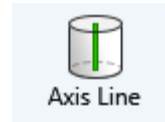


Version 6 supports the construction of

➤ **Midplane** of slots and widths



➤ **Axis Line** of slots

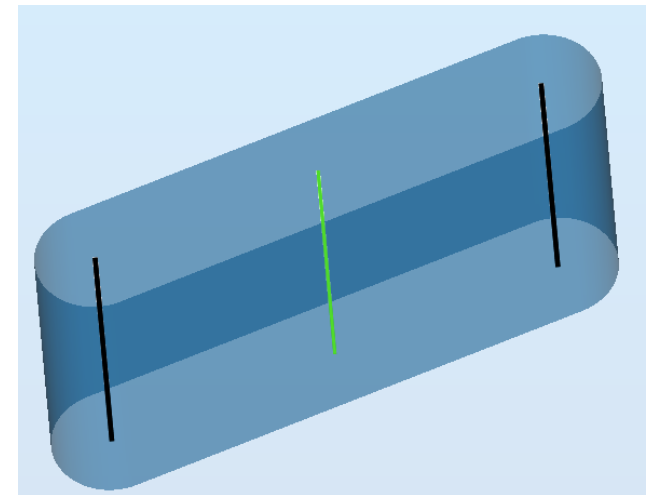
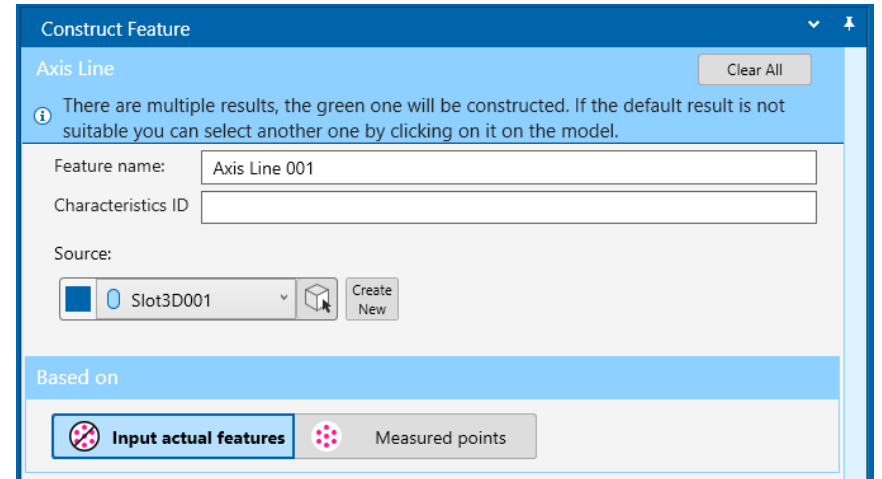


➤ **Tangent cylinder** to

- two cylinders
- a cylinder and a plane
- two planes



➤ **Tangent sphere** to cones

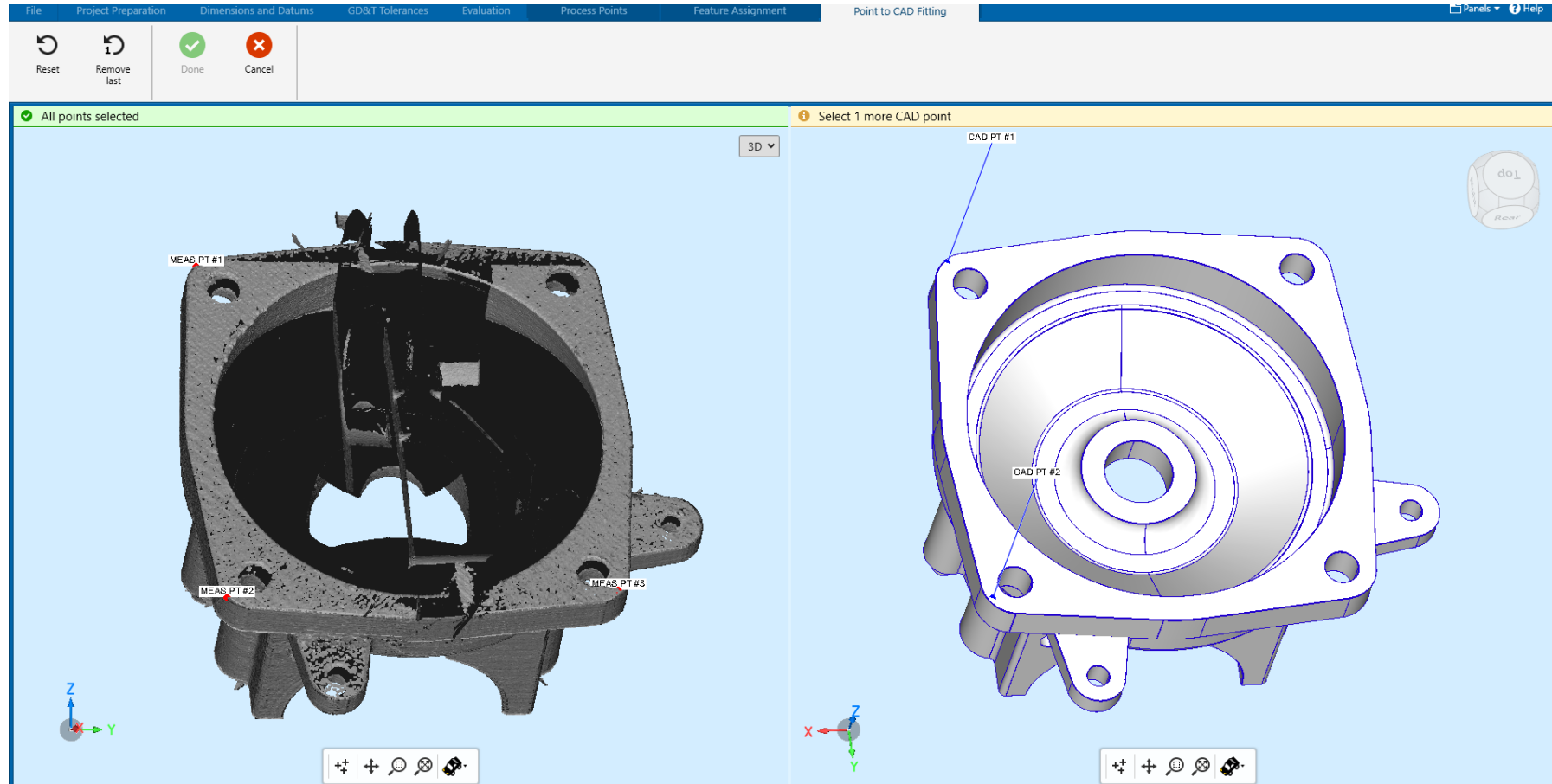




# Point to CAD fitting

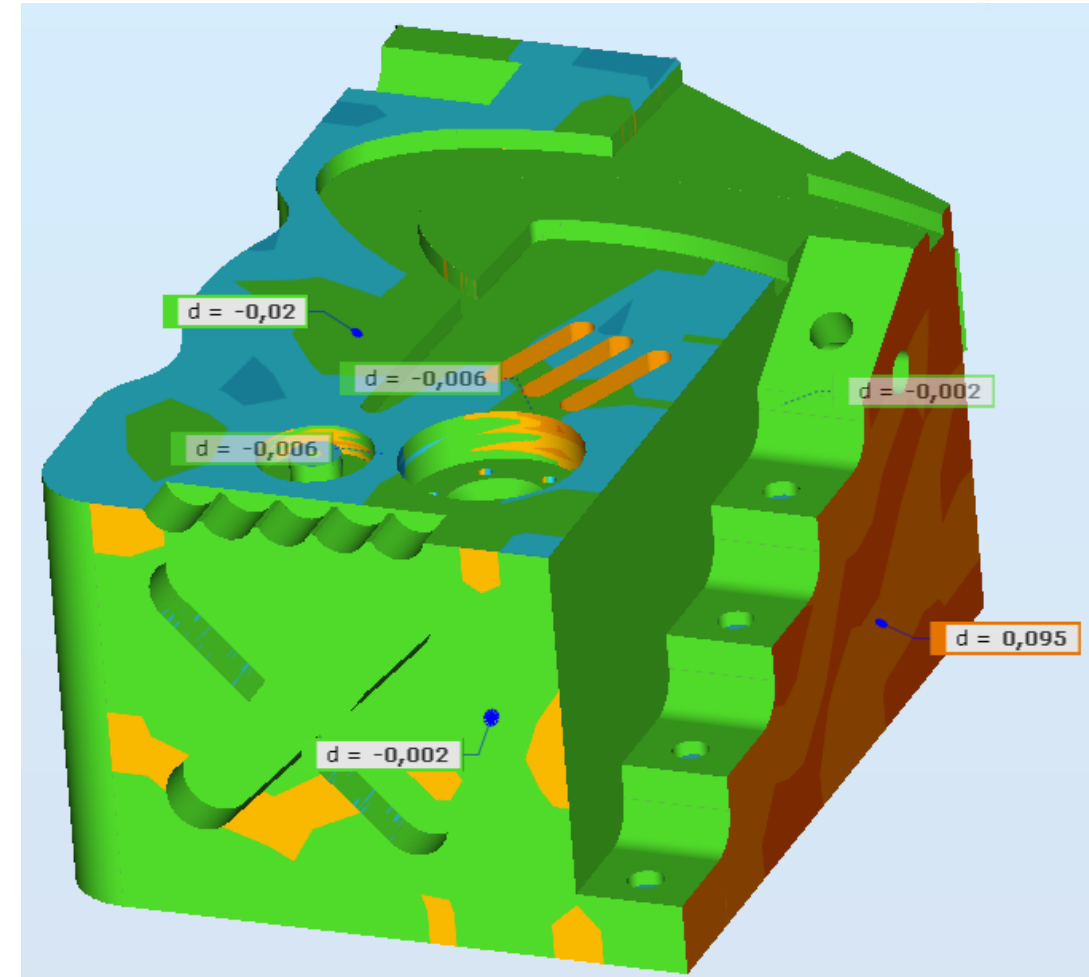


Separate views for points and CAD makes the selection easier



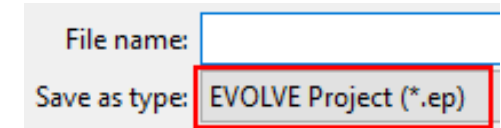
# Deviation label visualization

Deviation labels belonging to hidden points are transparent in the graphics view.



# Further enhancements

- New generic file format for the whole EVOLVE Suite:  
**.EP (Evolve Project)**

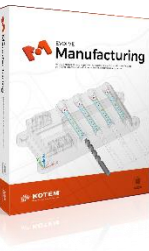


*Free ResultViewer can open all .EP files regardless of the source product.*

- Enhanced 'Dark UI Theme' for all products
- Improved language support
- Advanced installer and licensing for all products
- New and updated product videos: <https://vimeo.com/kotem/>



# Further enhancements



- Faster loading of the project files (performance improvement)
- Enhanced QIF v3.0 PMI import and export
- CMM points with tip radius are supported by all point filters
- Global alignment deviation values can be exported into Text report
- Updated Evolve Capture utility for scanning with new ShapeGrabber sensors
- Quick and easy view manipulation in 3D (NaviCube)

