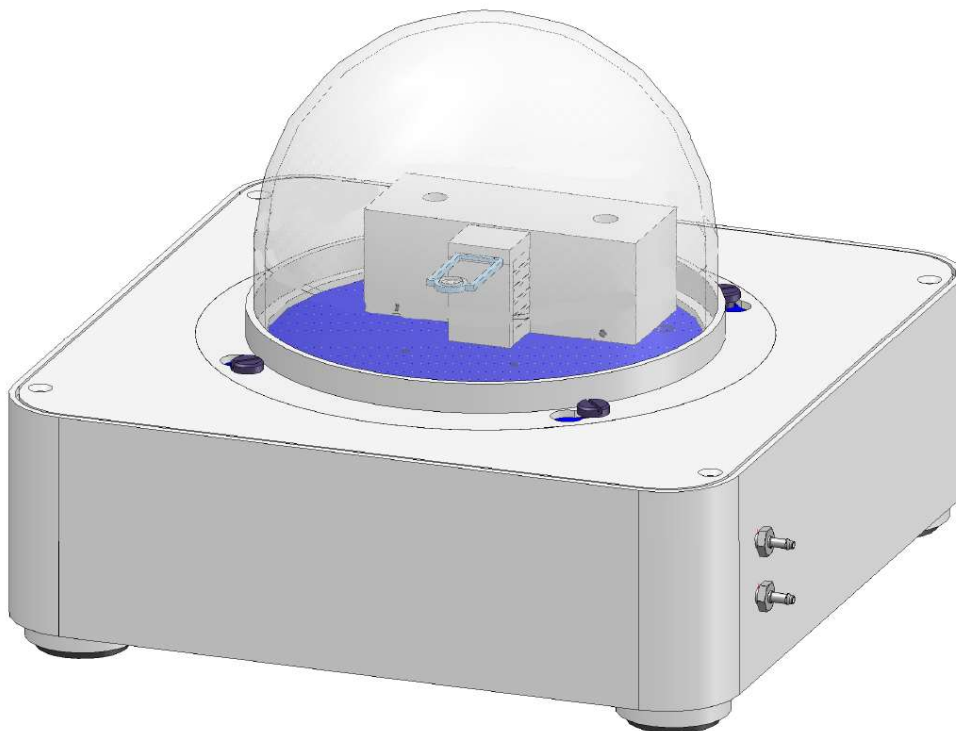


# How To Evaluate glass transitions with Chip DSC



Linseis Messgeräte GmbH

Gerlach

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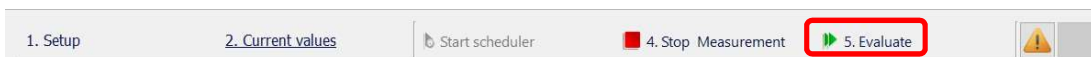
## 1. General information

This manual is a short description for handling measurements with the Chip DSC. The presented features are the most common, that are usually used. However, the evaluation software has much more features that cannot all be displayed here. For more Information, read the other available instructions about software or specific manuals for the Chip DSC.

## 2. Prepare the Evaluation and load curve(s)

### 2.1 Requirements

- At first you need a finished measurement
- If the measurement is not finished and you want to evaluate the curve in the measurement software, click on "Evaluate"



- If the measurement already finished start the evaluation software and Log in



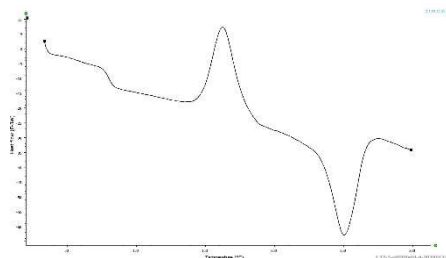
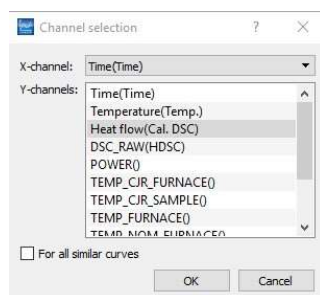
- Create a new project (Ctrl + N)

### 2.2 Load curve(s)

- Click on load curve



- Select the curve you want to evaluate (with ctrl you can select more curves at once)
- Select the channels (data) you want to display as the x-axis and Y-axis on a data plot. (you can select more than one if necessary)



- To get access to the features, at first you need to select the curve! (left click on curve)

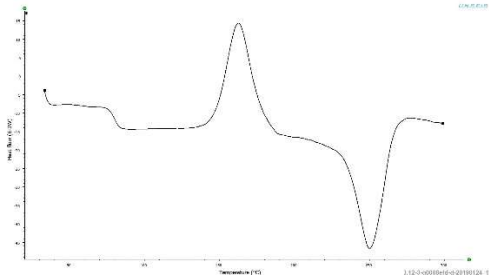
### 3. Arrange the curve(s)

#### 3.1 rotate (if necessary)

- Click on the Rotate tool



- Select the first point (axis to rotate the whole curve around)
- Select the second point (click on it and move it to the position you want)



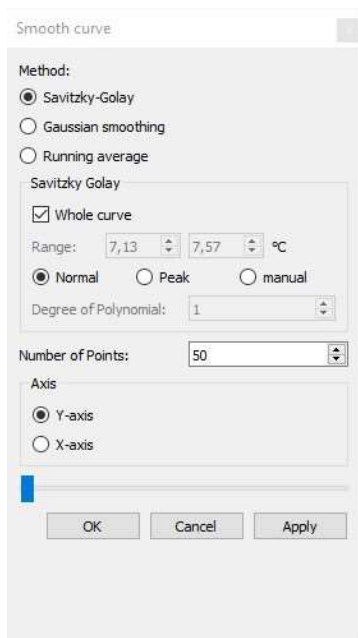
- Press Enter

#### 3.2 smooth (if necessary)

- Click on smooth tool



- Select type and range for smoothing

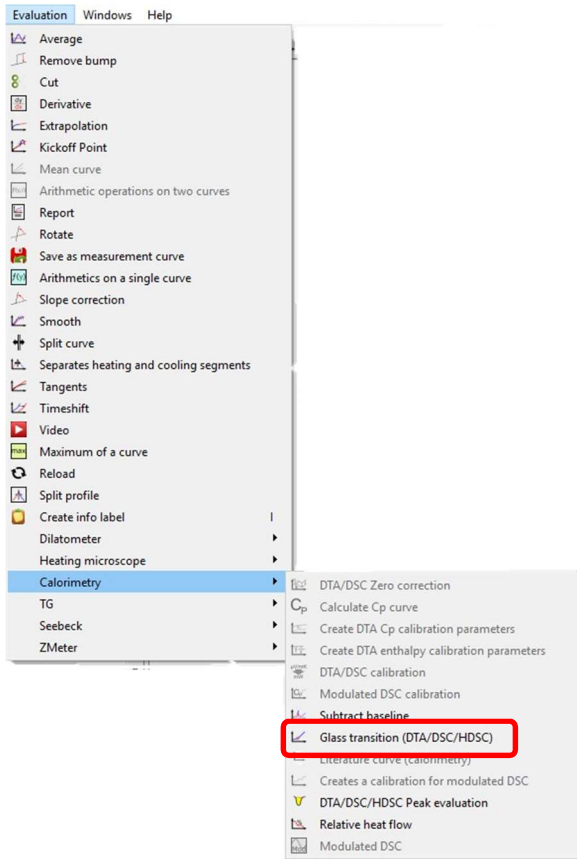


- Press Apply

## 4. Determine Glass Transition

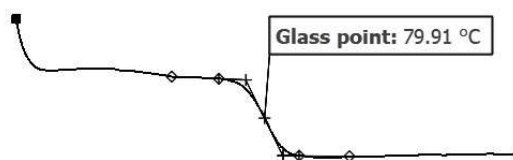
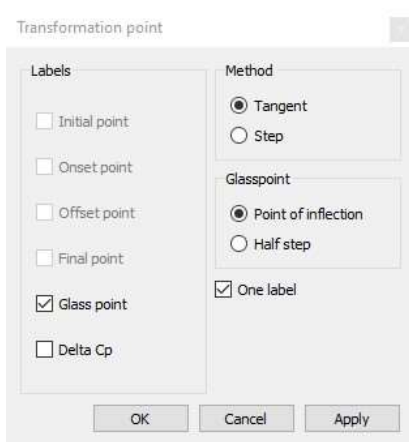
### 4.1 Select the Glass Transition function

- o Click on evaluation Tab and choose Glass Transition in the calorimetry category



### 4.2 Determine the thermal effect

- o Select the method you want to use

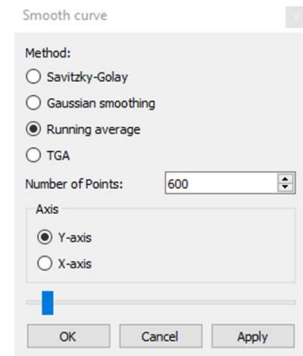


- o Choose the labels you want to display
- o Move the four points on the curve if necessary
- o Press Ok or Apply

## 5. Detect glass transition with temperature modulated DSC

In some cases glass transitions are really weak and hard to detect. One option to highlight them is using temperature modulated DSC. Following some hints using this additional option for Chip-DSC:

- Use He-atmosphere for faster and better heat transfer
- Make sure the heating rate is low enough to receive 4 periods in the temperature range of your glass transition
- Make sure amplitude is small enough and period is long enough so the temperature can follow the nominal temperature and your DSC-signal provide a good sine
- It is not necessary to subtract any Cp-correction or Cp-calibration curve. Just smooth your modulated measurement to receive the DSC signal.
- Settings for smoothing:
  - Type: moving average
  - Number of points:  $n_{\text{smoothing}} = t_{\text{period}} / t_{\text{sampling interval}}$
- Hint: check your signal first in Cal-DSC over time. The smoothed signal is much clearer without steps like in temperature (check diagram below)



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