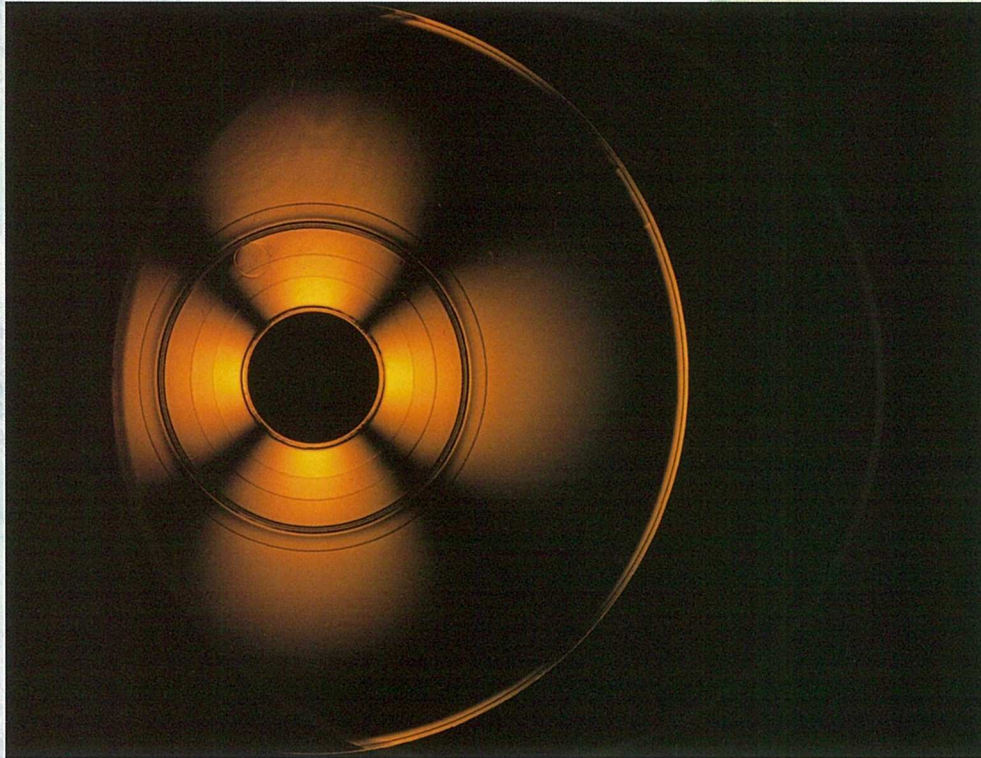


LUCEO Strain meter's Guide

Senarmont method



Senarmont Method is an inspection method to perform quantitative measurements of strain. When an angle scale of an analyzer is adjusted to 0° , the entire visual field appears dark in blackish color. It is started with searching of a position where strain to be assayed appears with the maximum brightness while rotating an article to be inspected, followed by fixing the position there. With rotating a rotating frame of an analyzer slowly, the region to be assayed is getting dark as shown in the photo given above. At the (During rotation of the rotating frame, not only brightness of the article to be inspected but also brightness of the visual field varies. Therefore, it is required to gaze only the region where strain has to be assayed.)

Quantity of strain is work out by applying the recorded rotated-angle into the following equation.

$$\text{Quantity of Strain} = \frac{\text{Analyzers Rotated angle}(\text{ }^\circ) \times \text{Phase Difference (nm) of } 1/4 \lambda \text{ Plate}}{45^\circ}$$

- * Phase difference given by a wave plate differs depending on individual strain meters. Need to refer to instructions for the respective strain meters.
- * Kindly refer to a separate comparison table as to rotated angles and strain.

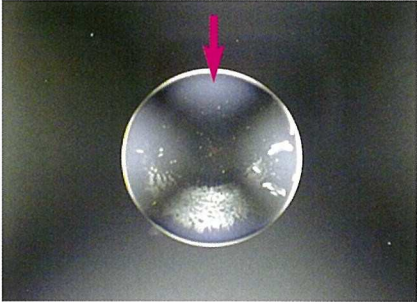
Remarks on Determination of Presence of Strain: In a strain meter, strain is inspected on the basis of color changes in a sample. When a sample to be inspected is inserted within a visual field, the sample gives no change in color and the visual field is maintained in the same appearance if the sample has no strain. However, when Senarmont Method is employed, even though the sample contains strain, there is a case where the whole or part of a sample gives no change in color and is kept in the same appearance as that of the visual field. Such a case is resulted from an occasion where the main stress direction of strain in the sample corresponds to the transmission axis of a polarizer or an analyzer.

Therefore, when a sample is observed under such a condition, the presence of strain in the sample may not be recognizable. As a remedy against this problem, a method to check changes in brightness and color in the whole or part of a sample while rotating the sample can be used. In this method, a sample is rotated by greater than 90° with gazing at the sample, and in case the sample gives no change in the brightness and color at any angles and appears in the same state as the visual field, it is determined that the sample has no strain in the whole or part. In case a change was found during the rotation of a sample, it is determined that the sample has strain in the part causing the change. Then, at the rotation angle at which the change was found, distribution and intensity of strain are to be evaluated.

Senarmont method

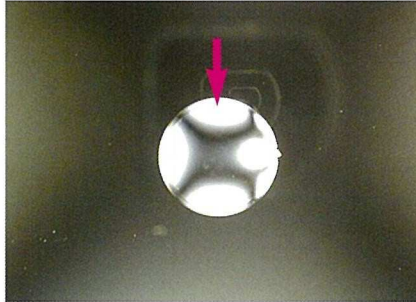
Rotated Angle of Analyzer 0°

This angle gives a position where a region to be assayed (indicated by an arrow) appears with the maximum brightness.



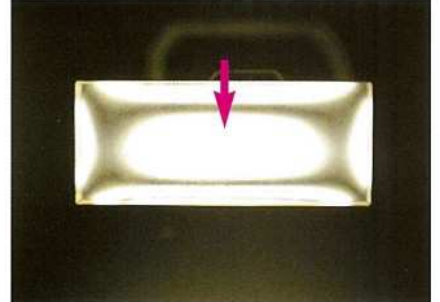
Rotated Angle of Analyzer 0°

This angle gives a position where a region to be assayed (indicated with an arrow) appears with the maximum brightness.



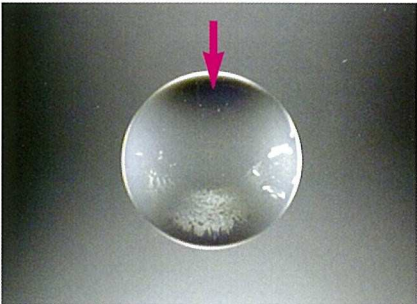
Rotated Angle of Analyzer 0°

This angle gives a position where a region to be assayed (indicated with an arrow) appears with the maximum brightness.



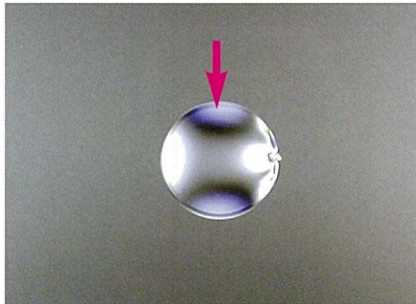
Rotated Angle of Analyzer 7°

This angle gives a position where a region to be assayed (indicated with an arrow) appears with the maximum darkness.



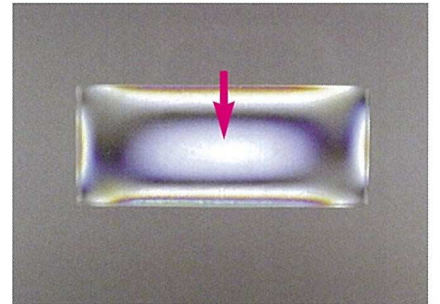
Rotated Angle of Analyzer 11°

A rotating frame of analyzer is rotated so that a region to be assayed (indicated with an arrow) gets darker.



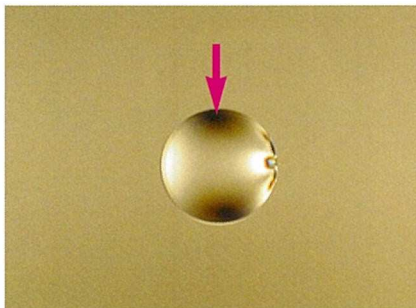
Rotated Angle of Analyzer 20°

A rotating frame of analyzer is rotated so that a region to be assayed (indicated with an arrow) gets darker.



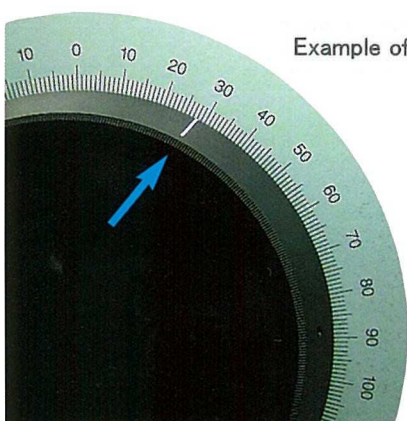
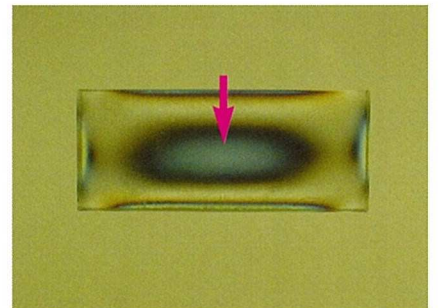
Rotated Angle of Analyzer 28°

This angle gives a position where a region to be assayed (indicated with an arrow) appears with the maximum darkness.



Rotated Angle of Analyzer 35°

A rotating frame of analyzer is rotated so that a region to be assayed (indicated with an arrow) gets further darker.



Example of angle scale of analyzer pointing at 28°

Rotated Angle of Analyzer 89°

This angle gives a position where a region to be assayed (indicated with an arrow) appears with the maximum darkness.

