



## LIST OF CALIBRATION COEFFICIENTS - EXAMPLE

Customer order:

Revision: A

Print date: 03.05.2021

Quality supervisor: tsalat@sylex.sk

Production supervisor: mmucka@sylex.sk

### EQUATIONS

#### STRAIN EQUATION

$$\Delta\varepsilon = \frac{\Delta\lambda - B \cdot \Delta T}{A}$$

$$\Delta\lambda = \frac{\lambda_{act} - \lambda_0}{\lambda_0} \quad \Delta T = (T_{act} - T_0)$$

#### STRING EXPRESSION

$$\Delta\varepsilon = ((\Delta\lambda - B \cdot \Delta T) / A)$$

$$\Delta\lambda = ((\lambda_{act} - \lambda_0) / \lambda_0)$$

$$\Delta T = (T_{act} - T_0)$$

For the determination of the strain sensitivity the free fiber length was used as a basis

\*\*1 To be measured after installation of the sensor

\*\*2 Measured value during monitoring of the sensor

#### TEMPERATURE EQUATION

$$T = T_{S1} \left( \frac{\lambda_{T,act} - \lambda_{T,ref}}{\lambda_{T,ref}} \right)^2 + T_{S2} \left( \frac{\lambda_{T,act} - \lambda_{T,ref}}{\lambda_{T,ref}} \right) + T_{S3}$$

| Measurand                  | Description                |
|----------------------------|----------------------------|
| T [°C]                     | Temperature                |
| $\lambda_{T,act}$ [nm] **1 | Actual temp. wavelength    |
| $\lambda_{T,ref}$ [nm]     | Reference temp. wavelength |
| $T_{S1}$ [°C]              | Temperature sensitivity 1  |
| $T_{S2}$ [°C]              | Temperature sensitivity 2  |
| $T_{S3}$ [°C]              | Temperature sensitivity 3  |

#### STRING EXPRESSION

$$T = T_{S1} * ((\lambda_{T,act} - \lambda_{T,ref}) / \lambda_{T,ref})^2 + T_{S2} * ((\lambda_{T,act} - \lambda_{T,ref}) / \lambda_{T,ref}) + T_{S3}$$

### CALIBRATION COEFFICIENTS

| Nr. | Serial number | Customer code | Product   | STRAIN COEFFICIENTS         |                       | TEMPERATURE COEFFICIENTS |               |               |                        |
|-----|---------------|---------------|---|-----------------------------|-----------------------|--------------------------|---------------|---------------|------------------------|
|     |               |               |   | A [ $\mu\varepsilon^{-1}$ ] | B [°C <sup>-1</sup> ] | $T_{S1}$ [°C]            | $T_{S2}$ [°C] | $T_{S3}$ [°C] | $\lambda_{T,ref}$ [nm] |
| 1   | 193075/0001   |               | DSS-01/T; WL: 1538,5/1539,9nm, LCP-03:1x1,1mtr, 1x2,9mtr, 2x FC/APC | 7,75842E-07                 | 5,89292E-06           | -1,54538E+06             | 5,33782E+04   | 2,25017E+01   | 1538,31052             |