sylex® FIBER OPTICS

LIST OF CALIBRATION COEFFICIENTS - EXAMPLE

Customer order:		**Revision:** A	**Print date:** 30.03.2021
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EQUATIONS

STRAIN EQUATION

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

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

Measurand	Description
$\Delta\varepsilon$ [µε]	Strain shift
$\lambda_{0.inst.strain}$ [nm] **1	Initial strain wavelength
$T_{0,inst}$ [°C] **1	Initial temperature
T_{act} [°C] **2	Actual temperature
$\lambda_{act,strain}$ [nm] **2	Actual strain wavelength
L_{FFL} [m]	Free fiber length

STRING EXPRESSION

Δε = ((Δλ - B * ΔT) / A)
Δλ = ((λact - λ0) / λ0)
ΔT = (T act - T0)

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 = Ts1*((λT,act -λT,ref)/λT,ref)^2+Ts2*((λT,act -λT,ref)/λT,ref)+Ts3

CALIBRATION COEFFICIENTS

Nr.	Serial number	Customer code	Product	STRAIN COEFFICIENTS			TEMPERATURE COEFFICIENTS			
				A [µε⁻¹]	B [°C⁻¹]	L_{FFL} [m]	T_{S1} [°C]	T_{S2} [°C]	T_{S3} [°C]	$\lambda_{T,ref}$ [nm]
1	194716/0001		SWS-02; WL: 1548,9/1549,9nm, LCP-03: 2x 1mtr; 2x FC/APC, 2x WCP-01	7,77351E-07	5,89292E-06	0,032	-1,89801E+06	5,30998E+04	2,25029E+01	1548,69164