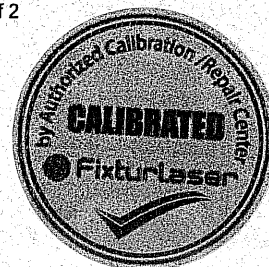


Calibration Certificate No: 58944-20150413

DATE OF ISSUE: 2015-04-13

PRODUCT NAME : Fixturlaser S1
ARTICLE NO : 1-0755
SERIAL NO : 58944

**PRODUCT SPECIFICATION**

DETECTOR : $0.3\% \pm 0.007 \text{ mm}$
INCLINOMETER : $\pm 0.5^\circ$
LASER CLASSIFICATION : The laser is classified in accordance with the International Standard IEC-60825-1:2007. Laser class 2. USA FDA Standard 21 CFR, CH1, Part 1040.10 and 1040.11, except for deviations pursuant to laser notice No. 50, dated June 24, 2007.

CALIBRATION PROCEDURE

The system is calibrated over a specified measurement range of 200 mm distance between transmitter and receiver. This means that a 1.000 mm lateral movement from the ideal zero position will result in a value accurate within 0.010 mm and the result of a 2.000 mm lateral movement will be accurate within 0.013 mm, etc. The CCD is calibrated in 1.000 mm steps, the angle of the inclinometer is calibrated in steps of 90 degrees and verified in steps of 30 degrees and controlled by the calibration software MV-0147 version 2.2.0.0.

TRACEABILITY

The test equipment is checked according to instruction SI-0010, using a RENISHAW ML10 LASER UNIT ser. no. H31962 calibrated by the SP Technical Research Institute of Sweden and traceable to their iodine-stabilized He-Ne laser (SP2). The rotation stage is checked with a Wyler AG Clinometer ser.no. 002726, traceable to Swiss Calibration Service. The laser output power is measured by a power meter, which is calibrated against a radiometer and traceability to international standard.

UNCERTAINTY

Included in the total calibration accuracy specification is the calculated uncertainty for the calibration equipment according to instruction SI-0010. The calibration equipment is more than four (4) times more accurate than the total calibration accuracy in all calibrations, except for those systems where the positions $\pm 0.500 \text{ mm}$ are calibrated (see table of linearity deviation). At these positions, the calibration equipment is 2.7 times more accurate than the specified calibration accuracy.

TEST EQUIPMENT USED

Equipment for calibration, identification no: FL40-061

TEST ENVIRONMENT

Temperature: $24^\circ\text{C} \pm 2^\circ\text{C}$

Humidity: 31 - 40%

CALIBRATION CHECK: Pass/Fail determined if within or outside detector specs of $0.3\% \pm 0.007 \text{ mm}$, inclinometer ± 0.5 , without any regards to uncertainty.

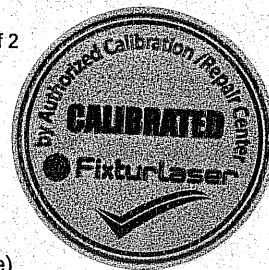
Manufacturer: ACOEM AB

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Web: www.fixturlaser.com

Registered in Sweden No: 556238-4437
Registered head office: Göteborg

Calibration Certificate No: 58944-20150413



TEST RESULT

Pre-calibration result according to the product specification
Calibration result according to the product specification

: NA (Not Available) (Not Available)
: PASS

CHECK BEFORE CALIBRATION

SET POINT (mm)	ACTUAL VALUE (mm)	DEVIATION (mm)	CONFORM TO SPEC. YES or NO
-12	NA	NA	NA
-11	NA	NA	NA
-10	NA	NA	NA
-9	NA	NA	NA
-8	NA	NA	NA
-7	NA	NA	NA
-6	NA	NA	NA
-5	NA	NA	NA
-4	NA	NA	NA
-3	NA	NA	NA
-2	NA	NA	NA
-1	NA	NA	NA
0	NA	NA	NA
1	NA	NA	NA
2	NA	NA	NA
3	NA	NA	NA
4	NA	NA	NA
5	NA	NA	NA
6	NA	NA	NA
7	NA	NA	NA
8	NA	NA	NA
9	NA	NA	NA
10	NA	NA	NA
11	NA	NA	NA
12	NA	NA	NA

CALIBRATION RESULT

SET POINT (mm)	ACTUAL VALUE (mm)	DEVIATION (mm)	CONFORM TO SPEC. YES or NO
-12	-11,990	-0,010	YES
-11	-10,994	-0,006	YES
-10	-9,994	-0,006	YES
-9	-8,992	-0,008	YES
-8	-7,993	-0,007	YES
-7	-6,992	-0,008	YES
-6	-5,995	-0,006	YES
-5	-4,995	-0,005	YES
-4	-3,995	-0,005	YES
-3	-2,998	-0,002	YES
-2	-1,996	-0,004	YES
-1	-1,000	0,000	YES
0	0,000	0,000	YES
1	1,003	0,003	YES
2	2,000	0,000	YES
3	3,001	0,001	YES
4	4,003	0,003	YES
5	5,002	0,002	YES
6	6,003	0,002	YES
7	7,003	0,003	YES
8	8,003	0,003	YES
9	9,001	0,001	YES
10	10,002	0,002	YES
11	11,001	0,000	YES
12	12,000	0,000	YES

INCLINOMETER CHECK

SET POINT (DEGREES)	ACTUAL VALUE (DEGREES)	DEVIATION (DEGREES)	CONFORM TO SPEC. YES or NO
0	NA	NA	NA
30	NA	NA	NA
60	NA	NA	NA
90	NA	NA	NA
120	NA	NA	NA
150	NA	NA	NA
180	NA	NA	NA
210	NA	NA	NA
240	NA	NA	NA
270	NA	NA	NA
300	NA	NA	NA
330	NA	NA	NA

INCLINOMETER RESULT

SET POINT (DEGREES)	ACTUAL VALUE (DEGREES)	DEVIATION (DEGREES)	CONFORM TO SPEC. YES or NO
0	0,037	0,037	YES
30	30,050	0,050	YES
60	60,088	0,088	YES
90	90,110	0,110	YES
120	120,080	0,080	YES
150	150,037	0,037	YES
180	179,968	-0,032	YES
210	-150,007	-0,007	YES
240	-119,975	0,025	YES
270	-89,918	0,082	YES
300	-59,915	0,085	YES
330	-29,958	0,042	YES

CALIBRATION DATE : 2015-04-13

End of Report

OPERATOR :


Magnus Ebbesson
Assembler

Manufacturer: ACOEM AB

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