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CER_AHA_001	Rev: 01	IN

Calibration Report n° AHAXXXXXXX_65640

Issued 28/04/2026

Customer

Name	C**USTOMER**
Address	A**DDRESS**
	A**DDRESS**
Country	C**OUNTRY**

Order

Number

Instrument

Type	AUTOMATIC HARDNESS- SHORE A
Model	HARDNESS MEASURING HEAD- DRIVE - SHORE A
Producer	GIBITRE INSTRUMENTS S.R.L.
Serial Number	AHAX**XXXXXX**

Calibration

Date of the measures	**27/04/2026**	
Technician	**Cristiana Beretta**	Habilitation for Calibration

Reference Standard

The calibration is made in accordance to the requirements of the following standards:

ISO 48-4:2018 Rubber, vulcanized or thermoplastic— Determination of hardness - Part4: Indentation hardness by durometer method (Shore hardness)

ISO 48-9:2018 Rubber, vulcanized or thermoplastic— Determination of hardness - Part 9: Calibration and verification of hardness testers

The measurement uncertainties stated in this document have been determined according to the ISO/IEC Guide 98 and to EA-4/02. Usually they have been estimated as expanded uncertainty obtained multiplying the standard uncertainty by the coverage factor k corresponding to a confidence level of about 95%. Normally, this factor k is 2.

Calibration made by:

Cristiana Beretta

Calibration Report approved by:

Ivan Locatelli

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The measurement results reported in this Calibration Report were obtained following the procedures given in the following pages, where the reference standards or instruments are indicated which garantee the traceability chain of the laboratory, and the related calibration certificates in the course of validity are indicated as well. They relate only to the calibrated item and they are valid for the time and conditions of calibration, unless otherwise specified.

Reference Instruments	Producer	Serial N.	Gibitre Code	Certificate N.	Calibration Laboratory	Issue Date	Due Date	Uncertainty	Unit
Cronometro	RS COMPONENTS	GBT.CN.01/13	CRO02 [0-60 s]	LAT 056 23-0199_2023	GAMMA MISURE	09/02/23	09/02/2028	0,1000	s
Comparatore millesimale 13,5 mm.	Mitutoyo	16005914	COM02 [0.41-13.5 mm]	LAT 051 C12126B680	TRESCAL	29/08/21	29/08/2026	0,0008	mm
Pesiera	Sartorius AG	PES01	PES01 [1-500 g]	LAT 117_23_M_1437	CIBE	20/04/23	20/04/2027	0,0002	g
Pesiera	Sartorius AG	PES01	PES01 [1000-5000 g]	LAT 117_23_M_1437	CIBE	20/04/23	20/04/2027	0,0030	g
Termoresistenza PT100 + Calibratore	Gibitre Instruments srl	C1-T-PTA	C1-GB3-CAL-1 + C1-T-PTA	LAT_128T_1417_22	ELLAB S.r.l.	25/09/22	25/09/2027	0,0540	°C
Termoigrometro digitale	MICHELL	308696-309058	TIG02 [10-90 Ur%]	LAT 123 24-SU-0938	CAMAR ELETTRONICA s.r.l.	27/05/24	27/05/2029	1,6000	Ur %
Calibratore + Cella Carico 58 N	Interface + Gibitre Instruments	C10-HS-1	C10-GB3-CAL-1 + C10-HS-1	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,0124	N
Calibratore + Cronometro	Gibitre Instruments srl	C10-CH-1	C10-GB3-CAL-1 + C10-CH-1	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,1618	s
Spessore Taratura Shore	Gibitre Instruments srl	C10-HS-R1	C10-HS-R1	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,0008	mm
Spessore Taratura Shore	Gibitre Instruments srl	C10-HS-R2	C10-HS-R2	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,0008	mm
Spessore Taratura Shore	Gibitre Instruments srl	C10-HS-R3	C10-HS-R3	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,0008	mm
Spessore Taratura Shore	Gibitre Instruments srl	C10-HS-R4	C10-HS-R4	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,0008	mm
Spessore Taratura Shore	Gibitre Instruments srl	C10-HS-R5	C10-HS-R5	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,0008	mm
Spessore Taratura Shore	Gibitre Instruments srl	C10-HS-R6	C10-HS-R6	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,0008	mm

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Termoresistenza PT100 + Calibratore	Gibitre Instruments srl	C10-T-PTA	C10-GB3-CAL-1 + C10-T-PTA	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,0603	°C
Calibratore + Sensore Umidità	Gibitre + Michell	C10-RH-1	C10-GB3-CAL-1 + C10-RH-1	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	1,6011	RH%

ENVIRONMENTAL CONDITIONS

Room Temperature	(23 ± 2) °C
Relative Humidity	(50 ± 10) %

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Visuall inspection of the indentor

Procedure: The integrity of the indentor is visually inspected

Integrity of the indentor: OK

Instrument verification with rubber samples

Procedure: The correct working of the instrument is checked before and after the calibration using rubber test samples

Set of rubber samples used:

C10-PHA

Sample	Expected Value	Minimum Allowed	Maximum Allowed	Measure After Calibration
	Shore	Shore	Shore	Shore
C10-PHA-1	45,3	43,3	47,3	45,1
C10-PHA-3	66,0	64,0	68,0	65,9
C10-PHA-5	84,1	82,1	86,1	83,9

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Calibration of: **Depth of indentation and Spring Force**

Procedure: Several known indentations are applied to the indentor. For each indentation applied, the shore reading and the force applied by the spring of the instrument are recorded. The sequence is repeated 3 times. The measure are used for the calibration of the Depth of Indentation and of the Spring Force versus Hardness.

Reference Instruments:

C10-HS-R1	Uncertanty:	0,0008	mm	Thickness:	0,133	mm
C10-HS-R2	Uncertanty:	0,0008	mm	Thickness:	0,630	mm
C10-HS-R3	Uncertanty:	0,0008	mm	Thickness:	0,983	mm
C10-HS-R4	Uncertanty:	0,0008	mm	Thickness:	1,246	mm
C10-HS-R5	Uncertanty:	0,0008	mm	Thickness:	1,495	mm
C10-HS-R6	Uncertanty:	0,0008	mm	Thickness:	1,985	mm
C10-GB3-CAL-1 + C10-HS-1	Uncertanty:	0,0124	N	Deviation:	0,110	N

Measures

Reference Instrument	Displacem. Applied	Instrument Hardness reading 1	Force applied Reading 1	Instrument Hardness reading 2	Force applied Reading 2	Instrument Hardness reading 3	Force applied Reading 3
	mm	Shore	mN	Shore	mN	Shore	mN
	2,50	100,00		100,00		100,00	
C10-HS-R1	2,37	94,90	7655,4	95,00	7653,3	95,00	7662,4
C10-HS-R2	1,87	75,30	6155,2	75,20	6168,5	75,20	6164,5
C10-HS-R3	1,52	60,90	5104,8	60,90	5107,6	61,00	5107,6
C10-HS-R4	1,25	50,50	4313,4	50,40	4308,4	50,50	4306,1
C10-HS-R5	1,01	40,50	3560,7	40,60	3561,7	40,60	3564,0
C10-HS-R6	0,52	20,90	2106,8	20,90	2102,0	20,90	2106,3

Acceleration due to gravity applied: gn=9,80665m/s2

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Calibration of: **Depth of indentation**

Sensor Type: **Displacement sensor**
Resolution: 0,01 Shore

Reference Standard: **ISO 48-9. Chapter 5.2.3**

Results of the Verification

Set Displacem.	Expected Shore reading	Minimum Allowed	Maximum Allowed	Instrument Reading 1	Instrument Reading 2	Instrument Reading 3	Mean	Accuracy	Uncertanty U_ext_95%	Outcome
mm	Shore	Shore	Shore	Shore	Shore	Shore	Shore	Shore	Shore	
2,50	100,0	99,2	100,8	100,0	100,0	100,0	100,0	0,0	0,01	ok
2,37	94,7	93,9	95,5	94,9	95,0	95,0	95,0	0,3	0,07	ok
1,87	74,8	74,0	75,6	75,3	75,2	75,2	75,2	0,4	0,07	ok
1,52	60,7	59,9	61,5	60,9	60,9	61,0	60,9	0,3	0,07	ok
1,25	50,2	49,4	51,0	50,5	50,4	50,5	50,5	0,3	0,07	ok
1,01	40,2	39,4	41,0	40,5	40,6	40,6	40,6	0,4	0,07	ok
0,52	20,6	19,8	21,4	20,9	20,9	20,9	20,9	0,3	0,03	ok

Calibration of: **Spring force versus Hardness**

Reference Standard: **ISO 48-9. Chapter 5.2.5**

Set Displacem.	Expected Force applied	Minimum Allowed	Maximum Allowed	Calibrator Reading 1	Calibrator Reading 2	Calibrator Reading 3	Mean	Accuracy	Uncertanty U_ext_95%	Outcome
mm	mN	mN	mN	mN	mN	mN	mN	mN	mN	
2,37	7651,0	7613,5	7688,5	7655,35	7653,34	7662,39	7657,03	6,03	5,49	ok
1,87	6160,0	6122,5	6197,5	6155,20	6168,53	6164,51	6162,75	2,75	7,90	ok
1,52	5101,0	5063,5	5138,5	5104,82	5107,59	5107,59	5106,67	5,67	1,85	ok
1,25	4312,0	4274,5	4349,5	4313,39	4308,36	4306,10	4309,28	-2,72	4,31	ok
1,01	3565,0	3527,5	3602,5	3560,68	3561,68	3563,95	3562,10	-2,90	1,94	ok
0,52	2095,0	2057,5	2132,5	2106,79	2102,01	2106,29	2105,03	10,03	3,04	ok

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Calibration of: **Duration of Force application**

Sensor Type: **Internal Clock**
Resolution: 0,1 s

Procedure: The reference Chronometer is used to measure the actual time after which the instrument records the hardness reading

Reference Standard: **ISO 48-9. Chapter 5.2.7**

Reference Instruments:
C10-GB3-CAL-1 + C10-CH-1 Uncertanty: 0,1618 s Deviation: 0,00 s

Set Time s	Minimum Allowed s	Maximum Allowed s	Calibrator Reading 1 s	Calibrator Reading 2 s	Calibrator Reading 3 s	Mean s	Accuracy s	Uncertanty U_ext_95% s	Outcome
3	2,7	3,3	2,96	3,03	2,98	2,99	-0,010	0,177	ok

Calibration of: **Sensor for Room Temperature measurment**

Sensor Type: **PT 100 Thermoresistance**
Resolution: 0,1 °C

Procedure: The ambient temperature probe reading of the instrument being calibrated is compared with the measurement of the reference instrument.

Reference Instruments:
C10-GB3-CAL-1 + C10-T-PTA Uncertanty: 0,0603 °C Deviation 0,12 °C

Readings of Room Temperature

Instrument Reading 1	Calibrator Reading 1	Minimum Allowed	Maximum Allowed	Accuracy	Uncertanty U_ext_95%	Outcome
°C	°C	°C	°C	°C	°C	°C
22,30	22,30	21,30	23,30	0,00	0,08	ok

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Calibration of: **Sensor for Sample temperature measurement**

Sensor Type: **PT 100 Thermoresistance**
Resolution: 0,1 °C

Procedure: The surface temperature reading of a specimen thermally conditioned for at least 30 minutes is compared with the ambient temperature measurement taken with the reference probe.

Reference Instruments:
C10-GB3-CAL-1 + C10-T-PTA Uncertanty: 0,0603 °C Deviation 0,12 °C

Temperature of test sample

Instrument Reading 1	Calibrator Reading 1	Minimum Allowed	Maximum Allowed	Accuracy	Uncertanty U_ext_95%	Outcome
°C	°C	°C	°C	°C	°C	°C
22,30	22,30	21,30	23,30	0,00	0,08	ok

Calibration of: **Sensor for Room Relative Humidity measurment**

Sensor Type: **Humidity Sensor**
Resolution: 1 RH%

Procedure: The reading of the Relative Humidity probe installed in the instrument being calibrated is compared with the measurement of the reference instrument.

Reference Instruments:
C10-GB3-CAL-1 + C10-RH-1 Uncertanty: 1,6011 RH% Deviation 0,10 RH%

Instrument Reading 1	Calibrator Reading 1	Minimum Allowed	Maximum Allowed	Accuracy	Uncertanty U_ext_95%	Outcome
RH%	RH%	RH%	RH%	RH%	RH%	
41,00	41,00	40,00	42,00	0,00	0,85	ok