Gibitre Instruments S.r.l.
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CER_AHM_001	Rev: 01	IN

Calibration Report n° AHMXXXXXX_65433

Issued 17/04/2026

Customer

Name	CUSTOMER
Address	ADDRESS
	ADDRESS
Country	COUNTRY

Order

Number	I60303

Instrument

Type	AUTOMATIC HARDNESS- MICRO IRHD
Model	HARDNESS MEASURING HEAD - DRIVE - IRHD-M
Producer	GIBITRE INSTRUMENTS S.R.L.
Serial Number	AHMXXXXXX

Calibration

Date of the measures	**13/04/2026**	
Technician	**Cristiana Beretta**	Habilitation for Calibration

Reference Standard

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

ISO 48-2:2018 Rubber, vulcanized or thermoplastic— Determination of hardness—Part2: Hardness between 10 IRHD and 100 IRHD

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 Instrument	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
Pesiera	Sartorius AG	PES01	PES01 [1-500 g]	LAT 117_23_M_1437	CIBE	20/04/23	20/04/2026	0,0002	g
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
Calibratore + Cella Carico 22 N	Interface + Gibitre Instruments	C10-HI-1	C10-GB3-CAL-1 + C10-HI-1	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,0017	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
Blocchetto Piano-Parallelo	Mitutoyo	162360	C10-L-1.24	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,0008	mm
Blocchetto Piano-Parallelo	Mitutoyo	165676	C10-L-1.31	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,0010	mm
Blocchetto Piano-Parallelo	Mitutoyo	172033	C10-L-1.41	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,0008	mm
Blocchetto Piano-Parallelo	Mitutoyo	172068	C10-L-1.45	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,0010	mm
Blocchetto Piano-Parallelo	Mitutoyo	163284	C10-L-1.5	CAL110_33238	GIBITRE INSTRUMENTS	02/09/25	02/09/2026	0,0010	mm

ENVIRONMENTAL CONDITIONS

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

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Visuall inspection of Indentor and Anular Foot

Procedure: The integrity of the indentor and of the Anular Foot are visually inspected

Integrity of the indentor: OK
Correct working of Anular Foot: 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-PHM

Sample	Expected Value	Minimum Allowed	Maximum Allowed	Measure After Calibration
	irhd	irhd	irhd	irhd
C10-PHM-1	46,3	44,3	48,3	46,1
C10-PHM-3	66,0	64,0	68,0	66,0
C10-PHM-5	86,4	84,4	88,4	86,4

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Calibration of: **Contact Force and Total Force on indentor. Force on Presser Foot**

Sensor Type: **Force sensor**
Resolution: 0,1 mN

Procedure: The reference force sensor is placed on the sample holder of the hardness tester and a hardness test is started. During the test, the force of the indentor, the contact force and the total force are recorded. The sequence is repeated 3 times.

Reference Standard: **ISO 48-9 Chapter 4**

Reference Instruments:
C10-GB3-CAL-1 + C10- Uncertanty: 0,0017 N Uncertanty: 0,11 %

Description	Nominal Value	Minimum Allowed	Maximum Allowed	Calibrator Reading 1	Calibrator Reading 2	Calibrator Reading 3	Mean	Accuracy	Uncertanty U_ext_95%	Outcome
	mN	mN	mN	mN	mN	mN	mN	mN	mN	
Contact Force on the Ball	8,3	7,8	8,8	8,45	8,66	8,70	8,60	0,30	0,275	ok
Total Force on the Ball	153,3	152,3	154,3	153,25	153,34	153,25	153,28	-0,02	0,206	ok
Force of the Anular Foot	235,0	205,0	265,0	239,40	232,50	234,16	235,35	0,35	7,208	ok

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Calibration of: **Depth of Indentation**

Sensor Type: **Displacement sensor**
Resolution: 0,002 mm

Procedure: Several known indentations are applied to the indentor. For each indentation applied, the IRHD hardness reading of the instrument is recorded. The sequence is repeated 3 times.

Reference Standard: **ISO 48-9 Chapter 5.2.3.5**

Reference Instruments:

C10-L-1.5	Uncertanty:	0,0010	mm	Thickness:	1,500	mm
C10-L-1.45	Uncertanty:	0,0010	mm	Thickness:	1,450	mm
C10-L-1.41	Uncertanty:	0,0008	mm	Thickness:	1,410	mm
C10-L-1.31	Uncertanty:	0,0010	mm	Thickness:	1,310	mm
C10-L-1.24	Uncertanty:	0,0008	mm	Thickness:	1,240	mm

Set Displacem.	Expected Hardness reading	Minimum Allowed	Maximum Allowed	Instrument Reading 1	Instrument Reading 2	Instrument Reading 3	Mean	Accuracy	Uncertanty U_ext_95%	Outcome
mm	irhd	irhd	irhd	irhd	irhd	irhd	irhd	irhd	irhd	
0,00	100,0	99,9	100,0	100,0	100,0	100,0	100,00	0,00	0,002	ok
0,05	83,6	82,9	84,3	83,9	83,8	83,8	83,83	0,23	0,067	ok
0,09	68,7	68,2	69,3	68,5	68,4	68,3	68,40	-0,30	0,115	ok
0,19	44,4	44,1	44,7	44,3	44,4	44,2	44,30	-0,10	0,115	ok
0,26	34,4	34,2	34,6	34,2	34,2	34,3	34,23	-0,17	0,067	ok

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Calibration of: **Duration of Force application**

Sensor Type: **Internal Clock**
Resolution: 0,01 s

Procedure: The reference Chronometer is used to measure the actual time of contact force and total force application.

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

Reference Instruments:
C10-GB3-CAL-1 + C10-CI 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
5	4,7	5,3	5,04	4,90	5,10	5,01	0,013	0,201	ok
30	29,7	30,3	30,08	29,97	30,06	30,04	0,037	0,175	ok