

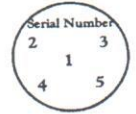
Tinius Olsen Standardized Hardness Test Block

1065 Easton Road, Horsham, 19044 Ph (215) 675-7100 www.testinghardness.com

*Certificate of Calibration and Conformance
For
Microindentation Vickers Test Block*

Certificate No.
11572

Indent Map



Hardness	727	HV ave	Date Cal	28-Sep-12	Temp	23 C
Serial No.	11572		Code	P	Humidity	20%
Load gf	1000		Force N	9.807	Tol+/-HV	28.2
Unc Mach	7.5	HV	Operator	RAE	Ave/stdev μm	50.5 0.151
Unc block	11.5	HV	Method	E384-11e1	Tol+/-μm	1.0

Group 1

μ m	HV
50.5	727
50.4	731
50.4	731
50.6	724
50.6	724

Group 2

μ m	HV
50.7	720
50.6	724
50.2	734
50.7	720
50.6	724

Group 3

μ m	HV
50.4	731
50.6	724
50.5	727
50.6	724
50.5	727

Group 4

μ m	HV
50.4	731
50.2	734
50.6	724
50.6	724
50.6	724

Group 5

μ m	HV
50.5	727
50.2	734
50.4	731
50.4	731
50.4	731

Group Ave

Hardness	HV	STDEV	μ m
Group 1	727	3.6	50.5
Group 2	725	5.8	50.6
Group 3	727	3.0	50.5
Group 4	727	5.0	50.5
Group 5	731	2.5	50.4

Hardness	727	HV 1	Uncertainty	+/-	11.5 HV	K=2
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The above calibration was verified with the following equipment, which is traceable to NIST or PTB.

Chatillon Digital Remote Gauge
Serial No.: 226

Stage Micrometer in mm
N.I.S.T. Test No.:NIST 5588

Mitutoyo Micro Hardness Tester MVK-H1
Serial Number 60594

N.I.S.T. SRM #2798 S/N C0003

The standardized test blocks are calibrated in accordance with ASTM E384 annex A2 using NIST standard reference material (SRM) #2798 and standards from PTB. All other indenter/loads combinations are traceable to Ellis hardness levels through laboratory standardizing machines. The standardizing machines are directly verified according to ASTM E384 A1.3.5 using devices that are traceable to NIST either directly or through an A2LA or NVLAP approved laboratory.

Expanded uncertainty uses coverage factor K=2, providing a confidence level of approximately 95%.

This test report is not to be used to claim product endorsement by the David L. Ellis Company Inc., A2LA, NVLAP or any government agency.

This block is calibrated according to A.S.T.M. E-384 part A2.5, ANSI (NCSL) Z540-1, (ISO) 10012, ISO IEC 17025, by David L Ellis

Co., Inc. 310 Old High Street, P.O. Box 592, Acton, MA 01720.



Certificate number 1310.01 NVLAP Calibration Laboratory No. 20012

SAMPLE

Representative

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