

# DAVID L. ELLIS COMPANY, INC.

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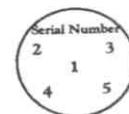
Certificate No.

90

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

Hardness	728	HV ave	Date Cal	3/20/08	Temp	23 C	Mag.	
Serial No.	90		Code	P	Humidity	20%	400x	
Load gf	300		Force N	2.9421	Tol+/-HV	28		
Unc Mach	13.0	HV	Operator	RAE	Ave/stddev $\mu\text{m}$	27.7	0.173	
Unc block	22.4	HV	Method	E384-08	Tol+/- $\mu\text{m}$	0.6		

Indent Map



Group 1			Group 2			Group 3		
$\mu\text{m}/\text{d1}$	$\mu\text{m}/\text{d2}$	HV	$\mu\text{m}/\text{d1}$	$\mu\text{m}/\text{d2}$	HV	$\mu\text{m}/\text{d1}$	$\mu\text{m}/\text{d2}$	HV
28.1	28.1	707	27.4	28.3	718	27.4	27.6	734
27.8	27.6	723	27.0	27.6	746	27.2	27.8	734
27.8	27.8	718	27.2	27.8	734	27.2	28.1	729
27.6	28.1	718	27.4	27.8	729	27.0	28.1	734
27.6	28.1	718	27.6	27.8	723	27.0	27.6	746

Group 4			Group 5			Group Ave			
$\mu\text{m}/\text{d1}$	$\mu\text{m}/\text{d2}$	HV	$\mu\text{m}/\text{d1}$	$\mu\text{m}/\text{d2}$	HV	Hardness	HV	STDEV	$\mu\text{m}$
27.6	27.8	723	27.4	27.6	734	Group 1	717	6.0	27.9
27.2	27.8	734	27.4	27.8	729	Group 2	730	10.9	27.6
27.6	27.8	723	27.6	27.8	723	Group 3	736	6.3	27.5
27.6	27.6	729	27.6	27.8	723	Group 4	729	5.6	27.6
27.4	27.6	734	27.4	28.1	723	Group 5	727	5.0	27.7

<b>Hardness</b>	<b>728</b>	<b>HV 0.3</b>	<b>Uncertainty</b>	<b>+/-</b>	<b>22.4 HV</b>	<b>K=2</b>
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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 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 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 standards, ANSI (NCSL) Z540-1, (ISO) 10012, ISO/IEC 17025, by David L Ellis Co., Inc. A2LA certificate number 1310.01 Calibration and NVLAP 200127.

Representative

**This certificate may not be reproduced except in full**

  
Accredited 1310.01  
Calibration

SAMPLE ONLY

  
Lab Code: 200127-0  
Calibration Laboratories