

Date of Calibration: 05/10/97

# Q M SYSTEMS CORP. \*

FACTORY: 2077 N. E. 154 STREET  
NORTH MIAMI BEACH, FL 33162

## Calibration Certificate

of

STANDARDIZED  
HARDNESS TEST BLOCK

SERIAL N° .....1239.....

HARDNESS ....HRB.-.52.0.±.1.0..

| CALIBRATION    | INSPECTION     |
|----------------|----------------|
| .....53.0..... | .....53.0..... |
| .....53.0..... | .....53.0..... |
| .....51.0..... | .....51.0..... |
| .....51.0..... | .....51.0..... |
| .....52.0..... | .....52.0..... |

USED EQUIPMENT: HARDNESS TESTER  
WILSON - 4TT - BBa - SERIAL N° 1940

UNCERTAINTY OF MEASUREMENT ± 0.1

CALIBRATION TEMPERATURE 20° C ± 5° C

REFERENCE TEST BLOCK WILSON N° PB078890B

THICKNESS OF THE BLOCK 7.0 mm

Q M SYSTEMS TO A.S.T.M. SPECIFICATIONS

All "SERVICES" test blocks are manufactured by Q M SYSTEMS and calibrated in strict accordance with ASTM-E18-Standard Methods of Test for ROCKWELL HARDNESS at the SERVICE STANDARDIZING LABORATORY in Miami, Florida. Special "SERVICE" standardizing hardness testing machines have verification tolerance considerably more rigorous than for machines used for referee, laboratory, routine, or everyday production inspection Rockwell testing.

There is no absolute standard of hardness and there is no metal perfectly homogeneous. Standardized test blocks shall be used only on the test surface, (having official "SERVICE" standardization mark). Blocks shall never be reground after being used. Tests should be made at a regular spacing but not too close together or erratic reading due to work hardening will result.

These special STANDARDIZING machines used for manufacturing "SERVICE" test blocks provide separate verification of load application, penetrator, and the depth measuring device followed by a performance test. The applied loads are checked by the use of an elastic proving device (load cell) in the manner described in ASTM Methods E-4, Verification of Testing Machines. The depth measuring device is verified with procedures traceable to National Bureau of Standards (N.I.S.T.). The Diamond Sphero-Conical penetrators are verified at foreign National Standards Laboratories, both for the form by direct measurement of its shape, and a performance test.

Each "SERVICE" test block is specially prepared and heat treated to give the necessary homogeneity and stability of structure; and the lower surface has a fine ground finish. The test (upper) surface is fine ground and then polished so that the mean surface roughness does not exceed 12 micro-inch (0.003 mm center line average) at the time of calibration. "QMS" is etched on the test surface. Each "SERVICE" test block is marked with the arithmetic mean of the hardness values found in the standardization test prefixed by the scale designation, and followed by the tolerance range; the name "QMS" and the serial number.

  
ENGINEER PAUL THOMPSON