A Brief Overview of ASME B89 Structure and Standards

Brian Parry P.E.
Associate Technical Fellow
Boeing Research and Technology
Seattle, Washington
Chairman, B89 Committee

8 May 2012
Brief Overview of ASME B89 structure

• So what is dimensional metrology?

Metrology is simply “The Science of Measurement”

Just in case somebody was going to ask, the weather in Seattle at the moment is sunny and 58°F, with winds at 5 mph from the south east.
Brief Overview of ASME B89 structure

• ASME B89 Committee Charter is:

The calibration, performance evaluation, uncertainty evaluation, and specification of dimensional measuring instruments and gages and the methods of their use for measuring various geometrical characteristics such as lengths, plane surfaces, angles, circles, cylinders, cones, spheres, and tori, as well as profiles.

ASME B89 Committee is comprised of seven Divisions:

ASME B89.1 – Length
ASME B89.2 – Angles*
ASME B89.3 – Geometry
ASME B89.4 – Coordinate Measuring Technology
ASME B89.5 – General Principles and Definitions**
ASME B89.6 – Environment**
ASME B89.7 – Measurement Uncertainty

* - presently dormant      ** - almost dormant
**Brief Overview of ASME B89 structure**

The ANSI/ASME B89 Division on *Length* is comprised of the following Project Teams:

<table>
<thead>
<tr>
<th>Number</th>
<th>Project Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2</td>
<td>Gage Blocks using Comparators</td>
</tr>
<tr>
<td>1.5</td>
<td>Diameter Measurements (External)</td>
</tr>
<tr>
<td>1.6</td>
<td>Diameter Measurements (Internal)</td>
</tr>
<tr>
<td>1.7</td>
<td>Surveying Tapes</td>
</tr>
<tr>
<td>1.8</td>
<td>Laser Applications</td>
</tr>
<tr>
<td>1.9</td>
<td>Gage Blocks</td>
</tr>
<tr>
<td>1.10</td>
<td>Dial Indicators</td>
</tr>
<tr>
<td>1.13</td>
<td>Micrometers</td>
</tr>
<tr>
<td>1.14</td>
<td>Calipers</td>
</tr>
<tr>
<td>1.17</td>
<td>Thread Wires</td>
</tr>
<tr>
<td>1.18</td>
<td>Height Gages</td>
</tr>
<tr>
<td>1.19</td>
<td>Measurement of Master Spheres</td>
</tr>
<tr>
<td>1.20</td>
<td>Gages, General Purpose (Feeler Gages)</td>
</tr>
<tr>
<td>1.21</td>
<td>Bore Gages</td>
</tr>
</tbody>
</table>

[ASME Logo]
Brief Overview of ASME B89 structure

The ANSI/ASME B89 Division on Geometry is comprised of the following Project Teams:

3.1 Roundness
3.4 Axes of Rotation
3.7/3.8 Surface Plates - Granite and Cast Iron
3.9 Specifications of Geometric Measurands

B89.3.9 is a relatively new Project Team that has now been melded with a Y14 Project Team doing similar work. This will serve as a pilot project for how better harmonization can be achieved between the ASME B89, ASME Y14 and ASME B46 committees.

The above work is also being coordinated with the ASME H213 Committee.
Brief Overview of ASME B89 structure

The ANSI/ASME B89 Division on Coordinate Measuring Technology is comprised of the following Project Teams:

4.10 Software Evaluation
4.11 Probes and Probe Changers
4.14 Non Contact Scanning Probes
4.15 Dynamic Performance of CMMs
4.18 Video Systems, Comparator Evaluation
4.19 Optical CMM Evaluation
4.21 CMM Performance in Realistic Environments
4.22 Articulated Arm CMMs
4.23 Computer Aided Tomography

While not produced by a specific Project Team, Division 4 has also published (and has drafts of other documents) designated ASME B89.4.10360.2. This is an “Americanized” version of ISO 10360.2 (with additional content) which represents one approach to harmonization.
Brief Overview of ASME B89 structure

The ANSI/ASME B89 Division on *General Principles and Definitions* has no specifically defined Project Teams.

This Committee developed a document “Compendium of Definitions for Dimensional Metrology from ASME Codes and Standards Documents”. This document is published on the ASME Web and can be considered more of an aid or guide to Standards writers, rather than a standard in its own right.

Likewise, the ANSI/ASME B89 Division on *Environment* has no specifically defined Project Teams.

This Committee produced the iconic B89.6.2 Standard “Temperature and Humidity Environment for Dimensional Measurement”, now somewhat replaced by ISO 16015. The Committee also has a draft of a standard addressing standards for the environment in metrology laboratories.
Brief Overview of ASME B89 structure

The ANSI/ASME B89 Division on *Measurement Uncertainty* is comprised of the following Project Teams:

- **7.1** Guidelines For B89.7 Documents
- **7.2** Dimensional Measurement Planning
- **7.3** Decision Rules (Uncertainty in Conformance Testing)
- **7.4** General Principles for Measurement System Uncertainty
- **7.5** Traceability

These address the issue of uncertainty in measurements, using standardized terminology from ISO documents *International Vocabulary of Basic and General Terms in Metrology (VIM)* and the *Guide to the Expression of Uncertainty in Measurement (GUM)*