ASME B46 - PT32
Functional Standards Collection

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B46 Functional Standards Collection

Purpose

• Promote technology of surface texture measurement
• Increase awareness of surface metrology applications
• Provide pointer to industry standards which specify roughness & waviness values
• Reference particular measurement conditions, parameters, and values
B46  Functional Standards Collection
Relationship to B46.1-2009 Standard

• Function Standards list included as Non-Mandatory Appendix J
• Working list currently posted on ASME/Peerlink/Surface Finish Measurement Techniques website
  (www.asme.org)
  (www.SurfaceMetrology.org)
  (#surfacemetrology)
**B46 Functional Standards Collection**

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMA OS-1-1</td>
<td>Shaft Finish Requirements for Radial Lip Seals</td>
</tr>
<tr>
<td>ASME B16.5</td>
<td>Pipe Flanges</td>
</tr>
<tr>
<td>ASTM F37</td>
<td>Sealability of Gasket Materials</td>
</tr>
<tr>
<td>ASTM F2033-05</td>
<td>Total Hip Joint Prosthesis Bearing Surfaces</td>
</tr>
<tr>
<td>ASTM D7127-05</td>
<td>Abrasive Blast Cleaned Metal Surfaces</td>
</tr>
<tr>
<td>SAE J911-1998</td>
<td>Cold Rolled Sheet Steel</td>
</tr>
<tr>
<td>MPIF Std 58-2008</td>
<td>Powder Metal Products</td>
</tr>
</tbody>
</table>
Recommended Roughness Values for Shafts Using Radial Lip Seals

- Specify use of Gaussian filter cutoff value $L_c=0.25$ mm
- This filter setting focuses on shorter peak spacing features which are active on the scale of radial lip seal contact widths (0.25-0.50 mm)
- Parameters $R_a$, $R_z$, & $R_{pm}$ specified
- Shaft lead specified as $0 \pm 0.05$ degrees
Rubber Manufacturers Association
RMA OS-1-1  www.rma.org

Recommended Roughness Values for Shafts Using Radial Lip Seals
Pipe Flange Facing Finish

- Finish of contact faces of pipe flanges and connections specified in ASME B16.5 Sec 6.4.4
- This standard indicates that finishes judged by visual comparison with roughness standards and not by instruments having stylus tracers and electronic amplification
- “Roughness” values
  - 125 uin max for Tongue & Groove
  - 63-125 uin for side wall of groove
  - 125-250 uin for serrated finish (45-55 grooves/in)
American Society of Mechanical Engrs
ASME B16.5
www.asme.org

Pipe Flange Facing Finish
Surface Finish in Gasket Sealability Testing

• Specifies test platens for sheet gasket sealability (leak rate at load) testing in Section 5.2.4
• Roughness values in units of "uin RMS"
• Suggested that this be revised to more common parameter Ra, since use of RMS values has been discontinued and is not the same as the Rq or true RMS roughness height value
American Society for Testing & Materials
ASTM F37

Surface Finish in Gasket Sealability Testing
Total Hip Joint Prothesis and Hip Endoprothesis Bearing Surfaces Made of Metallic, Ceramic, and Polymeric Materials

- Hip joint prothesis components are measured using a cutoff length $L_c = 0.8$ mm
- Femoral head roughness 0.05 um Ra max at pole & 30° angle locations
- Acetabular component roughness is 2 um Ra max for polymeric materials, and 0.05 um Ra max for metallic and ceramic materials
- Hip endoprosthesis surfaces are 0.5 um Ra max
Total Hip Joint Prothesis and Hip Endoprothesis Bearing Surfaces Made of Metallic, Ceramic, and Polymeric Materials
Measurement of Surface Roughness of Abrasive Blast Cleaned Metal Surfaces Using a Portable Stylus Instrument

- Abrasive blast cleaned metal surfaces evaluated using roughness parameters Rt, Rmax, Rz, & Pc
- These are applied for surfaces with Rmax value between 10 – 150 um & with Pc value < 180 peaks/cm
- Stylus tip radius of 2 or 5 um may be used
- All parameter values reported at 5 locations and include the average parameter value
Measurement of Surface Roughness of Abrasive Blast Cleaned Metal Surfaces Using a Portable Stylus Instrument
Surface Texture Measurement of Cold Rolled Sheet Steel

- Sheet steel surfaces evaluated using roughness parameters
  Roughness Average (Ra) & Peak Density (Pc)
- Peak Count Level is an important measurement setting for determination of Peak Density. Peak Count Level is defined as the vertical distance between upper and lower boundary limits that are equidistant from the roughness mean line
- A value of 1.25 um is specified for Peak Count Level
- All parameter values are reported as an average of 10 measurements - 5 in longitudinal and 5 in transverse directions
Surface Texture Measurement of Cold Rolled Sheet Steel
Method for Determination of Surface Finish of Powder Metal (PM) Products

- Powder metal products evaluated using a chisel tip stylus 1.27 mm wide with a 10 um radius edge.
- If spherical tip is used, software shall be utilized to minimize effects of open surface porosity.
- Surface finish reported with the Ra parameter in whole microinch units.
- Other surface finish parameters may also be reported.
- A minimum of 3 traces in different locations is recommended.
Metal Powders Industries Federation
MPIF Standard 58-2008  www.mpif.org

Method for Determination of Surface Finish of Powder Metal (PM) Products
ASME B46.1-2009 Appendix J
Functional Standards Collection

- Published Industry Standards Only
- Corporate Standards: Proprietary
- “Preferred Practice”
  - Bearings
  - Gears
  - I.C. Engine Cylinder Bores
- Process Recipe vs. Surface Specification
- Academic Scientific Investigations
- Global Database?
ASME B46.1-2009 Appendix J
Functional Standards Collection

• Questions on initiative or content?
• Printed Standard vs. Real-Time List
• Functional Standards Collection vs. Methods for Determining Functional Correlations
  – (ASME B46 PT32 & PT40)
• ‘Open Mike’ concept (B46 original!)
• B46 PT35 Communications initiative
  – Paper, electronic, web, email, social network, …
ASME B46 PT32 Communications
Future Topics

• 16% Rule in ISO 4288 & ISO 1302
• Waviness Issues
• Wikipedia Entry Updates
• PT42 – Gage Capability
• PT50 – Stylus Tip Verification
• Functional Correlation Methods
• …ASME Peerlink, C&S