



TD -106 -1 Rev. No. 5 Form No.		<h1 style="text-align: center;">PRODUCT STANDARD</h1> <h2 style="text-align: center;">HYDERABAD</h2>		Prod. Std. No. GT11220																																																																															
				Rev. No. 00																																																																															
				Page 01 OF 28																																																																															
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p style="text-align: center;">COPYRIGHT AND CONFIDENTIAL</p> <p>The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.</p> </div> <div style="width: 65%;"> <h3>1. TABLE OF CONTENTS / INDEX</h3> <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">1.1. Table Of Contents</th> <th style="text-align: right;">Sheet No.</th> </tr> </thead> <tbody> <tr> <td>1. TABLE OF CONTENTS / INDEX</td> <td style="text-align: right;">2</td> </tr> <tr> <td> 1.1. Table Of Contents</td> <td style="text-align: right;">2</td> </tr> <tr> <td> 1.2. Index</td> <td style="text-align: right;">5</td> </tr> <tr> <td>2. SCOPE / PURPOSE / RESPONSIBILITY</td> <td style="text-align: right;">7</td> </tr> <tr> <td> 2.1. Scope</td> <td style="text-align: right;">7</td> </tr> <tr> <td> 2.2. Purpose</td> <td style="text-align: right;">7</td> </tr> <tr> <td> 2.3. Responsibility</td> <td style="text-align: right;">7</td> </tr> <tr> <td>3. GENERAL RULES</td> <td style="text-align: right;">7</td> </tr> <tr> <td> 3.1. Unit Of Measure</td> <td style="text-align: right;">7</td> </tr> <tr> <td> 3.2. Dimension Interpretation</td> <td style="text-align: right;">7</td> </tr> <tr> <td> 3.3. Detail Requirements</td> <td style="text-align: right;">7</td> </tr> <tr> <td> 3.4. External Forces.....</td> <td style="text-align: right;">8</td> </tr> <tr> <td> 3.5. Measurement Temperature.....</td> <td style="text-align: right;">8</td> </tr> <tr> <td> 3.6. Surface Tolerance</td> <td style="text-align: right;">8</td> </tr> <tr> <td> 3.7. Measurement Instruments.....</td> <td style="text-align: right;">8</td> </tr> <tr> <td> 3.8. Inspection Requirements.....</td> <td style="text-align: right;">8</td> </tr> <tr> <td> 3.9. Dimension Application.....</td> <td style="text-align: right;">8</td> </tr> <tr> <td> 3.10. Part Finish</td> <td style="text-align: right;">8</td> </tr> <tr> <td> 3.11. Latest Issue</td> <td style="text-align: right;">9</td> </tr> <tr> <td> 3.12. Drawing Scale</td> <td style="text-align: right;">9</td> </tr> <tr> <td> 3.13. Abbreviations</td> <td style="text-align: right;">9</td> </tr> <tr> <td> 3.14. Welding Symbols.....</td> <td style="text-align: right;">9</td> </tr> <tr> <td> 3.15. Drawing Numbers</td> <td style="text-align: right;">9</td> </tr> <tr> <td>4. DEFINITIONS</td> <td style="text-align: right;">9</td> </tr> <tr> <td> 4.1. Burr</td> <td style="text-align: right;">9</td> </tr> <tr> <td> 4.2. Chamfer</td> <td style="text-align: right;">9</td> </tr> <tr> <td> 4.3. Counterbore.....</td> <td style="text-align: right;">9</td> </tr> <tr> <td> 4.4. Countersink</td> <td style="text-align: right;">9</td> </tr> <tr> <td> 4.5. Fillet.....</td> <td style="text-align: right;">9</td> </tr> <tr> <td> 4.6. Sheet Metal.....</td> <td style="text-align: right;">10</td> </tr> <tr> <td> 4.7. Spotface</td> <td style="text-align: right;">10</td> </tr> <tr> <td> 4.8. Surface Defects</td> <td style="text-align: right;">10</td> </tr> <tr> <td>5. TOLERANCES FOR MACHINED SURFACES</td> <td style="text-align: right;">10</td> </tr> <tr> <td> 5.1. Tolerances Of Size And Location.....</td> <td style="text-align: right;">10</td> </tr> <tr> <td> 5.1.1. Metric Conversion</td> <td style="text-align: right;">11</td> </tr> <tr> <td> 5.1.2. Tolerances For Drilled Holes And Hole Depth</td> <td style="text-align: right;">12</td> </tr> <tr> <td> 5.1.3. Tolerances For Counterbores.....</td> <td style="text-align: right;">13</td> </tr> <tr> <td> 5.1.4. Tolerances For Reamed Holes (preferred sizes)</td> <td style="text-align: right;">13</td> </tr> </tbody> </table> </div> </div>						1.1. Table Of Contents	Sheet No.	1. TABLE OF CONTENTS / INDEX	2	1.1. Table Of Contents	2	1.2. Index	5	2. SCOPE / PURPOSE / RESPONSIBILITY	7	2.1. Scope	7	2.2. Purpose	7	2.3. Responsibility	7	3. GENERAL RULES	7	3.1. Unit Of Measure	7	3.2. Dimension Interpretation	7	3.3. Detail Requirements	7	3.4. External Forces.....	8	3.5. Measurement Temperature.....	8	3.6. Surface Tolerance	8	3.7. Measurement Instruments.....	8	3.8. Inspection Requirements.....	8	3.9. Dimension Application.....	8	3.10. Part Finish	8	3.11. Latest Issue	9	3.12. Drawing Scale	9	3.13. Abbreviations	9	3.14. Welding Symbols.....	9	3.15. Drawing Numbers	9	4. DEFINITIONS	9	4.1. Burr	9	4.2. Chamfer	9	4.3. Counterbore.....	9	4.4. Countersink	9	4.5. Fillet.....	9	4.6. Sheet Metal.....	10	4.7. Spotface	10	4.8. Surface Defects	10	5. TOLERANCES FOR MACHINED SURFACES	10	5.1. Tolerances Of Size And Location.....	10	5.1.1. Metric Conversion	11	5.1.2. Tolerances For Drilled Holes And Hole Depth	12	5.1.3. Tolerances For Counterbores.....	13	5.1.4. Tolerances For Reamed Holes (preferred sizes)	13
1.1. Table Of Contents	Sheet No.																																																																																		
1. TABLE OF CONTENTS / INDEX	2																																																																																		
1.1. Table Of Contents	2																																																																																		
1.2. Index	5																																																																																		
2. SCOPE / PURPOSE / RESPONSIBILITY	7																																																																																		
2.1. Scope	7																																																																																		
2.2. Purpose	7																																																																																		
2.3. Responsibility	7																																																																																		
3. GENERAL RULES	7																																																																																		
3.1. Unit Of Measure	7																																																																																		
3.2. Dimension Interpretation	7																																																																																		
3.3. Detail Requirements	7																																																																																		
3.4. External Forces.....	8																																																																																		
3.5. Measurement Temperature.....	8																																																																																		
3.6. Surface Tolerance	8																																																																																		
3.7. Measurement Instruments.....	8																																																																																		
3.8. Inspection Requirements.....	8																																																																																		
3.9. Dimension Application.....	8																																																																																		
3.10. Part Finish	8																																																																																		
3.11. Latest Issue	9																																																																																		
3.12. Drawing Scale	9																																																																																		
3.13. Abbreviations	9																																																																																		
3.14. Welding Symbols.....	9																																																																																		
3.15. Drawing Numbers	9																																																																																		
4. DEFINITIONS	9																																																																																		
4.1. Burr	9																																																																																		
4.2. Chamfer	9																																																																																		
4.3. Counterbore.....	9																																																																																		
4.4. Countersink	9																																																																																		
4.5. Fillet.....	9																																																																																		
4.6. Sheet Metal.....	10																																																																																		
4.7. Spotface	10																																																																																		
4.8. Surface Defects	10																																																																																		
5. TOLERANCES FOR MACHINED SURFACES	10																																																																																		
5.1. Tolerances Of Size And Location.....	10																																																																																		
5.1.1. Metric Conversion	11																																																																																		
5.1.2. Tolerances For Drilled Holes And Hole Depth	12																																																																																		
5.1.3. Tolerances For Counterbores.....	13																																																																																		
5.1.4. Tolerances For Reamed Holes (preferred sizes)	13																																																																																		
Ref.Doc. 348A9200 REV01	Revisions : Refer to record of revisions :	Prepared : SATHPAL	Approved : KAMAL	Date : 01.07.21																																																																															

TD -106 -1			PRODUCT STANDARD HYDERABAD	Prod. Std. No. GT11220					
Rev. No. 5 Form No.				Rev. No. 00					
				Page 02 OF 28					
<div><div>COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.</div><div><div>5.2. Geometric Deviations14</div><div>5.3. Datums14</div><div>5.4. Surface Finish14</div><div>5.4.1. Finishes - Machined Features14</div><div>5.4.2. Finishes - Stock Material..14</div><div>5.4.3. Journal Finishes14</div><div>5.4.4. Surface Imperfections14</div><div>5.4.5. Sealing Surfaces Using Loctite 51015</div><div>6. ACCEPTED PRACTICES AND SHOP RUN TOLERANCES15</div><div>6.1. Burrs and Sharp Edges15</div><div>6.2. Machined Fillets15</div><div>6.3. Countersink For Holes15</div><div>6.3.1. Countersink For Drilled Holes (all sizes)16</div><div>6.3.2. Countersink For Reamed Holes (all sizes)16</div><div>6.3.3. Countersink For Tapped Holes17</div><div>6.3.4. Countersinks For Flat Countersunk Head Screws And Rivets18</div><div>6.4. Depth Of Holes18</div><div>6.5. Blending Surfaces18</div><div>6.6. Cam Surfaces18</div><div>6.7. Centers For Machining19</div><div>6.8. Undercut - Tool Relief For Grinding20</div><div>6.9. Counterbore And Spotface20</div><div>6.9.1. Corner Radius At Bottom Of Counterbore And Spotface.....20</div><div>6.9.2. Parallelism Of Base21</div><div>6.10. Threads21</div><div>6.10.1. Thread Lengths (except pipe threads)21</div><div>6.10.2. Chamfers On Threaded Ends21</div><div>6.10.3. Thread Axis22</div><div>6.10.4. Tap Drill Depths For Blind Holes22</div><div>6.10.4.1. Screw Threads22</div><div>6.10.4.2. Acceptance Standards For Tapped Holes22</div><div>6.10.4.2.1. Visual Inspection22</div><div>6.10.4.2.2. Gage Check22</div><div>6.10.5. Pipe Threads24</div><div>6.11. Horizontal Joint25</div><div>6.12. Alignment - Dowels26</div><div>6.13. "Critical To Quality" (former practice "Key Quality Characteristics")26</div><div>6.13.1 General26</div><div>6.13.2 Definitions26</div><div>6.13.3 Symbol,26</div><div>6.13.4 Requirements27</div></div></div> <tr><td>Ref.Doc.</td><td>348A9200 REV01</td><td></td><td></td><td></td></tr>					Ref.Doc.	348A9200 REV01			
Ref.Doc.	348A9200 REV01								



PRODUCT STANDARD

HYDERABAD

Prod. Std. No. GT11220

Rev. No. 00

Page 03 OF 28


COPYRIGHT AND CONFIDENTIAL


The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.


Ref.Doc.


348A9200 REV'M


6.14. Vendor Requirement for Steam Turbine Components and Electric Generator Components	27
7 . FABRICATIONS	27
8 . MATERIALS	28
8.1. Specifications	28
8.2. Material Callout	28
8.3. Material Substitution	28
8.3.1. Approval	28
8.3.2. Obsolete Material	28
8.3.3. Commercial Grade Material	28
9 . CLEANLINESS.....	28
10 . PART IDENTIFICATION.....	28


TD -106 -1			PRODUCT STANDARD HYDERABAD	Prod. Std. No. GT11220	
Rev. No. 5 Form No.				Rev. No. 00	
				Page 04 OF 28	
<div><div><div>COPYRIGHT AND CONFIDENTIAL</div><div>The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.</div></div><div><div>Ref.Doc.</div><div>348A9200 REV01</div></div></div> <div><div>1.2. Index</div><div>Abbreviations, 9</div><div>Acceptance Standards For Tapped Holes, 22</div><div>Alignment - Dowels, 26</div><div>Blending Surfaces, 18</div><div>Burr, 9</div><div>Burrs and Sharp Edges, 15</div><div>Cam Surfaces, 18</div><div>Centers For Machining, 19</div><div>Chamfer, 9</div><div>Chamfers On Threaded Ends, 21</div><div>Cleanliness, 28</div><div>Commercial Grade Material, 28</div><div>Corner Radius At Bottom Of Counterbore And Spotface, 20</div><div>Counterbore, 9</div><div>Counterbore And Spotface, 20</div><div>Countersink, 9</div><div>Countersink For Flat Countersunk Head Screw And Rivets, 18</div><div>Countersink For Holes, 15</div><div>Critical To Quality (formed practice: "Key Quality Characteristics"), 26</div><div>Datums, 14</div><div>Depth Of Holes, 18</div><div>Detail Requirements, 7</div><div>Dimension Application, 8</div><div>Drawing Numbers, 9</div><div>Drawing Scale, 9</div><div>External Forces, 8</div><div>Fabrications, 27</div><div>Fillet, 9</div><div>Finishes - Machined Features, 14</div><div>Finishes - Stock Material, 14</div><div>Gage Check, 22</div><div>Geometric Deviations, 14</div><div>Horizontal Joint, 25</div><div>Inspection Requirements, 8</div><div>Journal Finishes, 14</div><div>Latest Issue, 9</div><div>Machined Fillets, 15</div><div>Material Callout, 28</div></div>					


TD -106 -1	Rev. No. 5 Form No.		<h1 style="text-align: center;">PRODUCT STANDARD</h1> <h2 style="text-align: center;">HYDERABAD</h2>	Prod. Std. No. GT11220 Rev. No. 00 Page 05 OF 28
<p style="text-align: center;">COPYRIGHT AND CONFIDENTIAL</p> <p>The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.</p>		<p> Material Substitution, 28 Materials, 28 Measurement Instruments, 8 Measurement Temperature, 8 Metric Conversion, 11 Obsolete Material, 28 Parallelism Of Base, 21 Part Finish, 8 Part Identification, 28 Pipe Threads, 24 Screw Threads, 22 Sealing Surfaces Using Loctite 510, 15 Sheet Metal, 10 Specifications, 28 Spotface, 10 Surface Defects, 10 Surface Finish, 14 Surface Imperfections, 14 Surface Tolerance, 8 Tap Drill Depths For Blind Holes, 22 Thread Axis, 22 Thread Lengths (except pipe threads), 21 Threads, 21 Tolerances For Counterbores, 13 Tolerances For Drilled Holes, 12 Tolerances For Reamed Holes, 13 Tolerances Of Size And Location, 10 Undercut - Tool Relief For Grinding, 20 Unit Of Measure, 7 Visual Inspection, 22 Welding Symbols, 9 </p>		
Ref.Doc.	348A9200 REV'M			

TD -106 -1 Rev. No. 5 Form No.		PRODUCT STANDARD HYDERABAD	Prod. Std. No. GT11220
			Rev. No. 00
			Page 06 OF 28
<div style="display: flex; justify-content: space-between;"> <div style="width: 15%;"> <p style="writing-mode: vertical-rl; transform: rotate(180deg);"> COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company. </p> </div> <div style="width: 85%;"> <p>2. SCOPE / PURPOSE / RESPONSIBILITY</p> <p>2.1. Scope This document supplements information appearing on engineering drawings and related documents, and interprets drawing practices and definitions. When this document is referenced, the tolerances and limits herein are the maximum permissible for applicable untoleranced dimensions shown on the drawing, and unless otherwise specified, the practices herein are required where applicable.</p> <p>The phrase "UNLESS OTHERWISE SPECIFIED" applies to all sections of this document.</p> <p>2.2. Purpose To establish uniform drawing practices and interpretation of drawing requirements as well as engineering requirements.</p> <p>2.3. Responsibility All revisions to this document must be reviewed by: PGE Standards, Bldg. 53-200 Schenectady, NY 12345</p> <p>3. GENERAL RULES</p> <p>3.1. Unit Of Measure The U.S. customary unit of measure (inch) is used in this document unless otherwise stated. The SI Metric unit of measure (millimeter) could equally well have been used without prejudice to the principles established. (Reference: 1 inch equals 25.4 millimeters)</p> <p>All linear dimensions specified on the drawing are in inches up to 120 inches. Above 120 inches, dimensions may be specified in feet (FT) and inches. Inch marks are omitted.</p> <p>3.2. Dimension Interpretation Dimensions, tolerances and dimensional terminology shall be interpreted in accordance with ASME Y14.5. Drawings shall be prepared, interpreted, and maintained to the revision of ASME Y14.5 that is in place at the time the drawing is created.</p> <p>3.3. Detail Requirements All requirements of detail and assembly drawings apply after all processes employed to produce the items are completed. Where dimensional and other requirements are not specified for an assembly, the requirements specified for the detail shall still apply at assembly.</p> </div> </div>			
<div style="display: flex; justify-content: space-between;"> <div style="width: 15%;"> <p>Ref.Doc.</p> </div> <div style="width: 85%;"> <p>348A9200 REV M</p> </div> </div>			

TD -106 -1	Rev. No. 5 Form No.		<h1 style="text-align: center;">PRODUCT STANDARD</h1> <h2 style="text-align: center;">HYDERABAD</h2>	Prod. Std. No. GT11220 Rev. No. 00 Page 07 OF 28
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.		<div data-bbox="309 322 576 349">3.4. External Forces</div> <p>All dimensions apply when parts or assemblies are free from external force(s), except that when parts or assemblies are subject to free state variations (are non-rigid), the dimensions shall be interpreted in accordance with ASME Y14.5. (see 3.2).</p> <div data-bbox="309 477 726 504">3.5. Measurement Temperature</div> <p>Standard temperatures for measuring all dimensions is 68° F (20° C). Parts may be measured at temperatures other than standard provided the temperature difference between the part to be measured and the measuring instrument does not exceed 100 divided by the measured distance in inches (100/L") for decimal dimensions having tolerance over .001 inches.</p> <p>T MAX. = 100/L" for decimals having a tolerance over .001 inches.</p> <div data-bbox="309 712 608 739">3.6. Surface Tolerance</div> <p>All surfaces of completed parts must be within specified tolerances and/or the sections of these applied practices pertaining to the process involved.</p> <div data-bbox="309 831 715 857">3.7. Measurement Instruments</div> <p>The tolerance specified is also a guide to the accuracy of the measuring instrument that should be used. In general, the gage used should be accurate to within 10% of the tolerance of the characteristic to be measured.</p> <div data-bbox="309 985 694 1012">3.8. Inspection Requirements</div> <p>Gaging and inspection methods are not limited to those described in this instruction. It is not intended that inspection will be increased or decreased because of the use of these instructions. Inspection requirements will be specified by Quality Control upon review of the Engineering Instructions and Manufacturing methods.</p> <div data-bbox="309 1169 665 1196">3.9 Dimension Application</div> <p>All dimensions on drawings apply to the finished part and not to the size of the drill, reamers, taps, cutters, etc., which are used to produce the part.</p> <div data-bbox="309 1288 518 1314">3.10 Part Finish</div> <p>All dimensions on finished parts are to be met after all processing. Processing includes all finishing operations such as heat treating, aging, sand blasting, buffing, etc..</p> <p>Where external inorganic finishes such as plating, anodizing, dichromating, or black oxide are applied, all dimensions shall be met after finish application unless otherwise specified on the drawing.</p> <p>Where external organic finishes such as paint, enamel, ceramic coating, or lacquer are applied, all dimensions shall be met prior to finish application unless otherwise specified on the drawing.</p>		
		Ref.Doc.	348A9200 REV'M	

TD -106 -1 Rev. No. 5 Form No.		PRODUCT STANDARD HYDERABAD	Prod. Std. No. GT11220
			Rev. No. 00
			Page 08 OF 28
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p style="text-align: center;">COPYRIGHT AND CONFIDENTIAL</p> <p>The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.</p> </div> <div style="width: 65%;"> <p>3.11. Latest Issue All work must be done to the latest issue of the drawings and instructions. All references on drawings are understood to apply to the latest issue of such references. Departure from this practice requires written authorization in the form of an Alteration Notice.</p> <p>3.12. Drawing Scale Drawings shall not be scale read.</p> <p>3.13. Abbreviations Abbreviations used on drawings are in accordance with the General Electric Corporate Engineering Documentation Manual. In the instance of special product development or customer requirements, where unique symbols or abbreviations are required on the drawing, the identification of such symbols or abbreviations must appear on the face of the drawing.</p> <p>3.14. Welding Symbols Welding, brazing, and non-destructive testing (NDT) symbols shall be interpreted in accordance with AWS A2.4. Drawings shall be prepared, interpreted, and maintained to the revision of AWS A2.4 that is in place at the time the drawing is created.</p> <p>3.15. Drawing Numbers All parts are to be identified by their drawing number. This number comprises both the number of the drawing and the part designation number and also the size designation if applicable. In order to properly identify the part, it is essential that all letters and numbers included in the drawing, part, and size designation be stamped on the part.</p> <p>4. DEFINITIONS</p> <p>4.1. Burr: A small amount of material extended out from the edge of a hole, shoulder, etc., as a result of a machining operation.</p> <p>4.2. Chamfer The result of bevel machining a sharp edge or thread end to a specified dimension and angle.</p> <p>4.3. Counterbore A flat-bottomed enlargement of a hole. It is specified by a diameter to a depth or remaining thickness.</p> <p>4.4. Countersink A conical surface at the edge of a circular hole. An external chamfer.</p> <p>4.5. Fillet The concave junction at two intersecting surfaces.</p> </div> </div>			
Ref.Doc. 348A9200 REV01			

TD -106 -1 Rev. No. 5 Form No.		<h1 style="text-align: center;">PRODUCT STANDARD</h1> <h2 style="text-align: center;">HYDERABAD</h2>		Prod. Std. No. GT11220																															
				Rev. No. 00																															
				Page 09 OF 28																															
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p style="writing-mode: vertical-rl; transform: rotate(180deg);"> COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company. </p> </div> <div style="width: 65%;"> <div style="border: 1px solid black; padding: 10px; margin-bottom: 10px;"> <p>4.6. Sheet Metal</p> <p>Sheet metal is designated in industry as rolled stock up to .250 thick. Heavier rolled stock is known as plate.</p> <p>4.7. Spotface</p> <p>The machined surface generally used at the face of a hole and intended to serve as a bearing surface. It is normal to the axis of the hole and is cut only deep enough to clean up the surface. Its diameter is specified, but depth is generally not specified. If the depth is critical, the depth of the spotface or the remaining thickness of material may be specified. It is sometimes designated greater than a boss diameter to realize full clean-up of surface.</p> <p>4.8. Surface Defects</p> <p>Marks on a finished surface other than normal tool marks, and includes inclusions, dents, digs, false cuts, etc..</p> </div> <div style="border: 1px solid black; padding: 10px; margin-bottom: 10px;"> <p>5. TOLERANCES FOR MACHINED SURFACES</p> <p>This section states the maximum allowable deviations for machined surfaces unless otherwise specified on the drawing or reference drawing.</p> <p>Machined surfaces are indicated on drawings by 500 microinch or smoother finish, except when such surfaces are noted "As Cast" or "As Forged".</p> <p>5.1. Tolerances Of Size And Location</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">DIMENSION (INCHES)</th> <th colspan="4">SIZE AND LOCATION TOLERANCE (INCHES)</th> </tr> <tr> <th>Over</th> <th>Up To & Including</th> <th>2 Place Decimal</th> <th>3 Place Decimal</th> <th>More Than 3 Place Decimal</th> <th>Angles</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>12</td> <td>± .02</td> <td>± .002</td> <td rowspan="4">Must Be Specified On Drawing</td> <td rowspan="4">± 1 Degree</td> </tr> <tr> <td>12</td> <td>24</td> <td>± .04</td> <td>± .003</td> </tr> <tr> <td>24</td> <td>72</td> <td></td> <td>± .005</td> </tr> <tr> <td>72</td> <td>Up</td> <td>± .06</td> <td></td> </tr> </tbody> </table> <p><i>Dimension that include machined and fabricated surfaces or features: Use table above.</i></p> <p>The above does not apply for commercially or nationally standardized or General Electric Company material specification items or features.</p> </div> </div> </div>						DIMENSION (INCHES)		SIZE AND LOCATION TOLERANCE (INCHES)				Over	Up To & Including	2 Place Decimal	3 Place Decimal	More Than 3 Place Decimal	Angles	0	12	± .02	± .002	Must Be Specified On Drawing	± 1 Degree	12	24	± .04	± .003	24	72		± .005	72	Up	± .06	
DIMENSION (INCHES)		SIZE AND LOCATION TOLERANCE (INCHES)																																	
Over	Up To & Including	2 Place Decimal	3 Place Decimal	More Than 3 Place Decimal	Angles																														
0	12	± .02	± .002	Must Be Specified On Drawing	± 1 Degree																														
12	24	± .04	± .003																																
24	72		± .005																																
72	Up	± .06																																	
Ref.Doc. 348A9200 REV'M																																			

TD -106 -1 Rev. No. 5 Form No.		<h1>PRODUCT STANDARD</h1> <h2>HYDERABAD</h2>	Prod. Std. No. GT11220
			Rev. No. 00
			Page 10 OF 28

5.1.1. Metric Conversion


For dual dimensioned drawings, the following applies for equivalent metric values of the U.S. (inch) tolerance.

Inch	mm	Inch	mm	Inch	mm	Inch	mm
.0001	0.002	.010	0.25	.028	0.71	.046	1.16
.0002	0.005	.011	0.27	.029	0.73	.047	1.19
.0003	0.007	.012	0.30	.030	0.76	.048	1.21
.0004	0.010	.013	0.33	.031	0.78	.049	1.24
.0005	0.012	.014	0.35	.032	0.81	.050	1.27
.0006	0.015	.015	0.38	.033	0.83	.051	1.29
.0007	0.017	.016	0.40	.034	0.86	.052	1.32
.0008	0.020	.017	0.43	.035	0.88	.053	1.34
.0009	0.022	.018	0.45	.036	0.91	.054	1.37
.001	0.025	.019	0.48	.037	0.93	.055	1.39
.002	0.05	.020	0.51	.038	0.96	.056	1.42
.003	0.07	.021	0.53	.039	0.99	.057	1.44
.004	0.10	.022	0.55	.040	1.01	.058	1.47
.005	0.12	.023	0.58	.041	1.04	.059	1.49
.006	0.15	.024	0.60	.042	1.06	.060	1.52
.007	0.17	.025	0.63	.043	1.09	.061	1.54
.008	0.20	.026	0.66	.044	1.11	.062	1.57
.009	0.22	.027	0.68	.045	1.14	.063	1.60

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED.
It must not be used directly or indirectly in any way detrimental to the interest of the company.

Ref.Doc.
 348A9200 REV'M

TD -106 -1 Rev. No. 5 Form No.		<h1>PRODUCT STANDARD</h1> <h2>HYDERABAD</h2>	Prod. Std. No. GT11220
			Rev. No. 00
			Page 11 OF 28


COPYRIGHT AND CONFIDENTIAL
 The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED.
 It must not be used directly or indirectly in any way detrimental to the interest of the company.

5.1.2. Tolerances For Drilled Holes And Hole Depth

DRILL NO.	DIAMETER AS SPECIFIED ON DRAWING		DEPTH TOLERANCE SPECIFIED ON DRAWING
78	.016	± .001	+06 -00
68	.031		
57	.042		
52	.063	± .002	
43	.089		
36	.107		
31	.120		
27	.144	± .003	
24	.152		
18	.170		
17	.173		
13	.185		
9	.196	±.004	
8	.199		
1	.228		
LETTER E	.250		
K	.281	±.005	
O	.316	+006 -005	
R	.339		
U	.368		
X	.397	+007	
FRACTION 7/16	.438	-005	+08 -00
1/2	.500	+008/-005	
9/16	.563	+009/-005	
5/8	.625	+010/-005	
11/16	.688	+011/-005	
3/4	.750	+012/-005	
13/16	.813	+013/-005	
7/8	.875	+014/-005	
15/16	.938	+015/-005	
1	1.000	+016/-005	
1 TO 3 (INCL. 3)	1.000 TO 3.000	+020/-005	
3 TO 4 (INCL. 4)	3.000 TO 4.000	+025/-005	
4 AND ABOVE	4 AND ABOVE	+035/-005	

Ref.Doc.

348A9200 REV'M

TD -106 -1 Rev. No. 5 Form No.		PRODUCT STANDARD HYDERABAD	Prod. Std. No. GT11220
			Rev. No. 00
			Page 12 OF 28

COPYRIGHT AND CONFIDENTIAL

 The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED.
 It must not be used directly or indirectly in any way detrimental to the interest of the company.

5.1.3. Tolerances For Counterbores

COUNTERBORE DIAMETER	TOLERANCE
UP TO .375	+0.015 / -.005
OVER .375 TO .625 INCL.	+ .025 / -.005
OVER .625 TO 1.125 INCL.	+0.030 / -.005
OVER 1.125 TO 3.00 INCL.	+0.035 / -.005
OVER 3.00 TO 5.00 INCL.	+0.040 / -.005
OVER 5.00 TO 6.00 INCL.	+0.045 / -.005

5.1.4. Tolerances For Reamed Holes (preferred sizes)

Size		Tolerance
Fractional	Decimal	
1/8	.1250	+0.0006 -.0000
3/16	.1875	+0.0006 -.0000
1/4	.2500	+0.0007 -.0000
5/16	.3125	+0.0007 -.0000
3/8	.3750	+0.0007 -.0000
7/16	.4375	+0.0008 -.0000
1/2	.5000	+0.0008 -.0000
9/16	.5625	+0.0008 -.0000
5/8	.6250	+0.0009 -.0000

Size		Tolerance
Fractional	Decimal	
11/16	.6875	+0.0009 -.0000
3 /4	.7500	+0.0010 -.0000
7/8	.8750	+0.0010 -.0000
1	1.0000	+0.0011 -.0000
1 1/4	1.2500	+0.0012 -.0000
1 1/2	1.5000	+0.0014 -.0000
2	2.0000	+0.0017 -.0000
2 1/2	2.5000	+0.0020 -.0000
3	3.0000	+0.0023 -.0000

Ref.Doc.
 348A9200 REV01



PRODUCT STANDARD

HYDERABAD

Prod. Std. No. GT11220

Rev. No. 00

Page 13 OF 28

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED.
It must not be used directly or indirectly in any way detrimental to the interest of the company.

5.2. Geometric Deviations

Geometric deviations are expected from normal workmanship. When design specifications dictate control more stringent than limits of size, these requirements will be specified on the drawing by use of geometric tolerance symbols.

5.3. Datums

See paragraph 3.2 for interpretation of datums.

5.4. Surface Finish

Surface finish symbols and terminology shall be interpreted in accordance with ANSI Y14.36. Drawings shall be prepared, interpreted, and maintained to the revision of ANSI Y14.36 that is in place at the time the drawing is created.

5.4.1. Finishes - Machined Features

Feature	Microinches
Drilled holes up to 1 inch	250
Drilled holes over 1 inch	500
Reamed holes	63
Flat surface of spotface	125
Flat surface of counterbore	125
Diameter of counterbore up to 1 inch	250
Diameter of counterbore over 1 inch	500
All threaded surfaces	125
All pipe cuts	2000

5.4.2. Finishes – Stock Material

When finishes are omitted on plate and bar stock, the finish requirements default to the following:

-Bar Stock	250 microinches.
-Plate stock – Burnout Edges	1000 microinches.
-All Other Surfaces	250 microinches.


Bar, angles, beams, or pipe material called for on parts lists and BOM's as net sizes are to have 500 microinch end cuts and be deburred as per paragraph 6.1.

5.4.3. Journal Finishes

All surfaces indicated as "Journal Finish" are to be one continuous surface. False cuts, digs, overlaps, or other surface defects are not acceptable.

5.4.4. Surface Imperfections

The depth or roughness of surface imperfections, such as gas holes, false digs, dents, or other surface flaws, are not to exceed the maximum surface roughness indicated for that particular surface.

TD -106 -1 Rev. No. 5 Form No.		PRODUCT STANDARD HYDERABAD	Prod. Std. No. GT11220
			Rev. No. 00
			Page 14 OF 28
<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> <p style="writing-mode: vertical-rl; transform: rotate(180deg);"> COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company. </p> </div> <div style="width: 80%;"> <p>5.4.5. Sealing Surfaces Using Loctite 510</p> <p>When using Loctite 510 for sealing metal to metal surfaces, the surface roughness shall not be better than 40 microinches, example: Gas Turbine Bearing Housings.</p> <p>6. ACCEPTED PRACTICES AND SHOP RUN TOLERANCES</p> <p>6.1. Burrs and Sharp Edges</p> <p>All burrs must be removed and all sharp corners dulled by any suitable process which will produce a radius or chamfer not to exceed .03 X .03 inches or be less than .003 X .003 inches.</p> <p>NOTE:</p> <p>Corners at three-way and four-way joints shall be left sharp and not chamfered. Chamfering such corners will cause a leak.</p> <p>When sharp edges, definite radii, or definite chamfers are required, they will be specified on the drawing. Chamfers require an additional operation and will be specified on the drawing by the length of one side and an angle.</p> <p>6.2. Machined Fillets</p> <p>On drawings with a radius indicated by "R" with no dimensional value, the actual radius achieved will be governed by the tool used, .016 inches minimum to .130 inches maximum, and will not be subject to inspection. When a specific radius is required, it will be specified on the drawing with an appropriate tolerance.</p> <p>6.3. Countersink For Holes</p> <p>Unless otherwise specified, all holes in finished surfaces are to be countersunk. The purpose of the countersink is to prevent damage at the joints and surfaces due to the possibility of raising the local surfaces around the holes.</p> </div> </div>			
Ref.Doc. 348A9200 REV'M			



PRODUCT STANDARD

HYDERABAD

Prod. Std. No. GT11220

Rev. No. 00

Page 15 OF 28

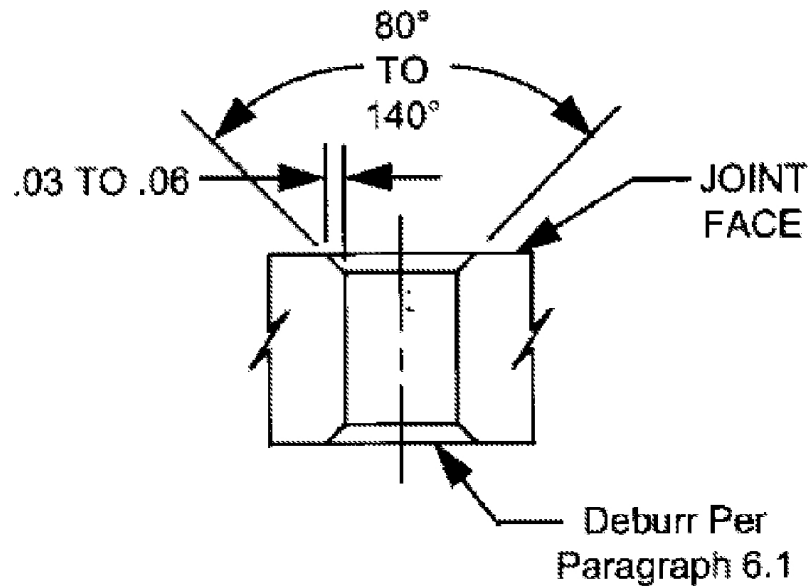
COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED.
It must not be used directly or indirectly in any way detrimental to the interest of the company.

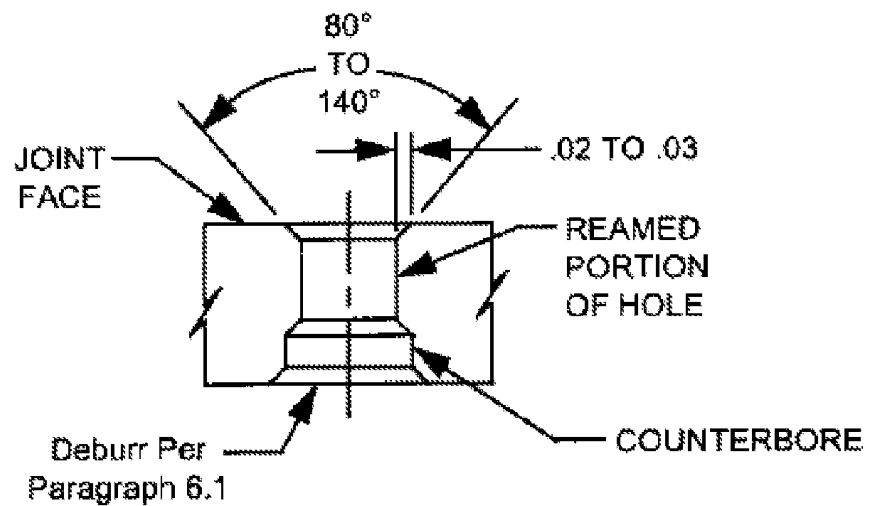
Ref.Doc.

348A9200 REV'M

6.3.1. Countersink For Drilled Holes (all sizes)



6.3.2. Countersink For Reamed Holes (all sizes)





PRODUCT STANDARD

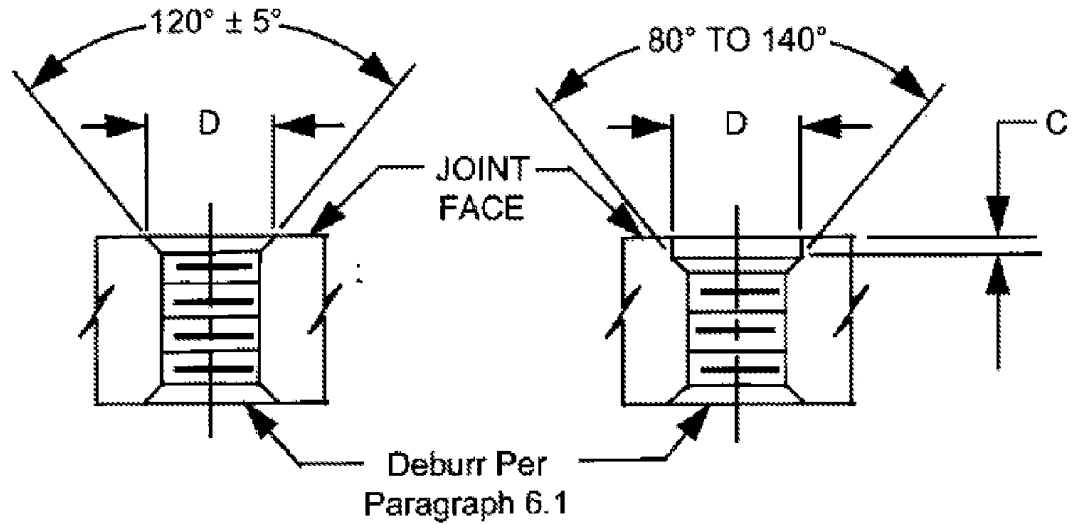
HYDERABAD

Prod. Std. No. GT11220

Rev. No. 00

Page 16 OF 28

6.3.3. Countersink for Tapped Holes



Preferred Method For
Material Thickness Under
.25 And Optional For
Thickness .25 And Over


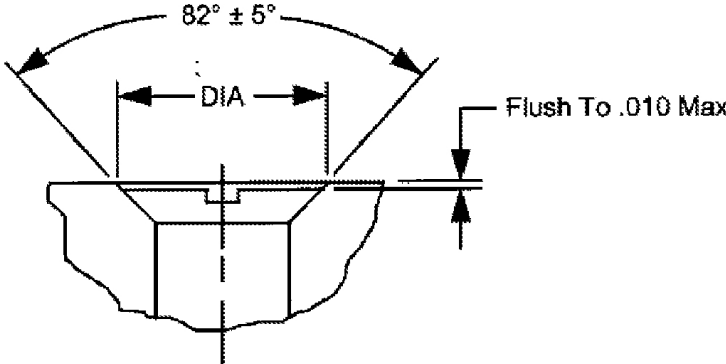
Preferred Method For
Material Thickness
Over .25

Countersink for Tapped Holes

TAP SIZE	C	D
#5	.031 ± .016	.156
#6	.031 ± .016	.172
#8	.031 ± .016	.203
#10	.031 ± .016	.234
.250 To .750	.062 ± .016	Nominal Tap Size +.062
Over .750	.125 ± .016	Nominal Tap Size +.125

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED.
It must not be used directly or indirectly in any way detrimental to the interest of the company.

TD -106 -1 Rev. No. 5 Form No.		PRODUCT STANDARD HYDERABAD	Prod. Std. No. GT11220
			Rev. No. 00
			Page 17 OF 28
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p style="writing-mode: vertical-rl; transform: rotate(180deg);"> COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company. </p> </div> <div style="width: 65%;"> <div style="border: 1px solid black; padding: 10px; margin-bottom: 10px;"> <p>6.3.4. Countersinks For Flat Countersunk Head Screws And Rivets</p> <p>When the diameter of countersink is not specified on the drawing, the countersink for flat countersunk head screws and rivets will be of sufficient depth to permit the screw or rivet head to be assembled flush or to a maximum of .010 inches below the surface.</p> <div style="text-align: center;">  </div> </div> <div style="border: 1px solid black; padding: 10px;"> <p>6.4. Depth Of Holes The depth of a hole called for on a drawing will be measured from the surface drilled to the depth of the full diameter, exclusive of the drill point.</p> <p>6.5. Blending Surfaces All connecting curved surfaces or curved and plane surfaces shown as tangent must blend smoothly unless otherwise specified.</p> <p>6.6. Cam Surfaces Surfaces labeled as "Cam Surfaces" shall follow a smooth and uniform transition from dimensioned point to dimensioned point, following the delineated profile. The surface must lie within a band not greater in width than the designated profile tolerance. In all cases the finished profile must always be ascending (never descending) from the low point (LP) to the high point (HP) of an ascending profile and descending (never ascending) from the high point (HP) to the low point (LP) on a descending profile. The low point(s), labeled LP, and the high points, labeled HP, will be indicated and dimensioned on the drawing.</p> </div> </div> </div>			
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <p>Ref.Doc.</p> </div> <div style="width: 65%;"> <p>348A9200 REV'M</p> </div> </div>			



PRODUCT STANDARD

HYDERABAD

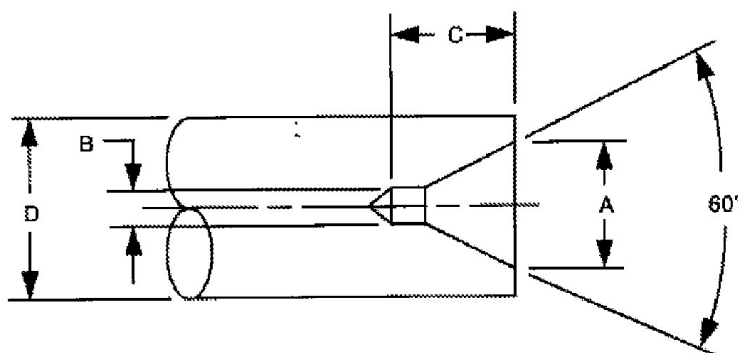
Prod. Std. No. GT11220

Rev. No. 00

Page 18 OF 28

6.7. Centers For Machining

Lathe center holes in shaft ends are permissible and will not be shown on the drawing except when necessary to limit their size. If center holes are not allowed, the drawing will so state.



It is assumed that a steady-rest is used when the centers have to sustain these loads.

DIAMETER OF STOCK D		A	B	C	CENTER DRILL COMM. SIZE NO.	MAXIMUM LOAD ON CENTER (POUNDS)
OVER	TO & INCL.					
.125	.156	.078	.046	.078	1	----
.156	.187	.109	.078	.109	2	----
.187	.250	.140	.078	.140	2	----
.250	.375	.171	.078	.156	2	----
.375	.625	.218	.125	.203	4	----
.625	1.000	.265	.125	.250	4	----
1.000	1.500	.312	.187	.296	5	----
1.500	2.000	.375	.187	.343	5	----
2.000	2.500	.562	.250	.500	7	2,500
2.500	3.000	.687	.312	.625	8	4,000
3.000	4.000	.750	.312	.750	----	6,400
4.000	5.000	1.000	.375	1.000	----	10,000
5.000	6.000	1.250	.375	1.250	----	16,000
6.000	8.000	1.500	.500	1.500	----	25,000
8.000	10.000	2.000	.500	2.000	----	48,000
10.000	12.000	2.500	.625	2.500	----	64,000
12.000	16.000	3.000	.750	3.000	----	100,000
16.000		4.000	1.000	4.000	----	165,000

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.



PRODUCT STANDARD

HYDERABAD

Prod. Std. No. GT11220

Rev. No. 00

Page 19 OF 28

COPYRIGHT AND CONFIDENTIAL

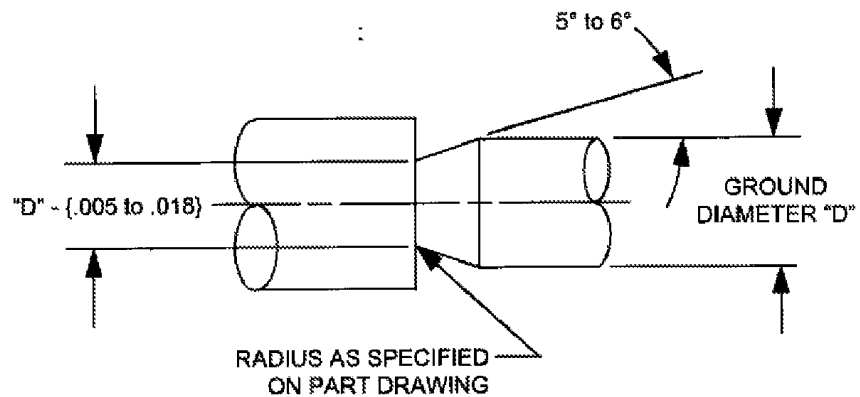
The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED.
It must not be used directly or indirectly in any way detrimental to the interest of the company.

Ref.Doc.

348A9200 REV'M

6.8. Undercut - Tool Relief For Grinding

On bolts, studs, shafts, pins, etc., with tolerance and finish requirements so close as to require grinding, especially adjacent to a shoulder. It is permissible to undercut the corner as shown below to avoid scraping shoulder and/or breaking down the corner of the grinding wheel or leaving a slight shoulder at end of ground diameter.



6.9. Counterbore And Spotface

(Also see paragraph 4.3 and 4.7)

6.9.1. Corner Radius At Bottom Of Counterbore And Spotface

A corner radius is to be provided at the bottom of all counterbores and spotfaces as follows:

Counterbore Or Spotface Diameter	Corner Radius
2.50 And Up	.12
Less Than 2.50	0.03 (Max)



PRODUCT STANDARD

HYDERABAD

Prod. Std. No. GT11220

Rev. No. 00

Page 20 OF 28

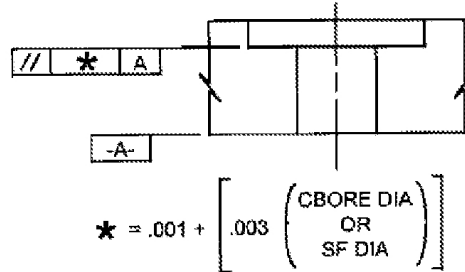
COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED.
It must not be used directly or indirectly in any way detrimental to the interest of the company.

Ref.Doc.

348A9200 REV'M

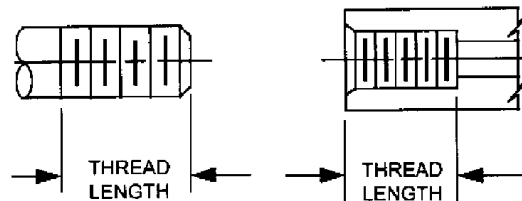
6.9.2. Parallelism Of Base



6.10. Threads

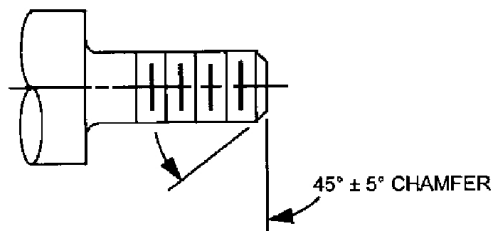
6.10.1. Thread Lengths (except pipe threads)

Thread length specified on the drawing is for full thread. Thread runout may extend beyond the dimension by three (3) threads maximum. Thread runout allowed back from a shoulder will be a maximum of three (3) threads per inch.



6.10.2. Chamfers On Threaded Ends

All threaded ends shall be chamfered. Drawings will show chamfer but no dimensions. The chamfer shall extend to root of thread and corner slightly rounded. Chamfer shall not extend below root diameter more than 1/2 the depth of thread.





PRODUCT STANDARD

HYDERABAD

Prod. Std. No. GT11220

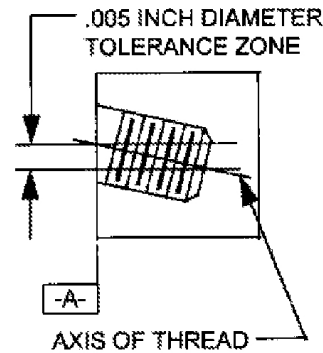
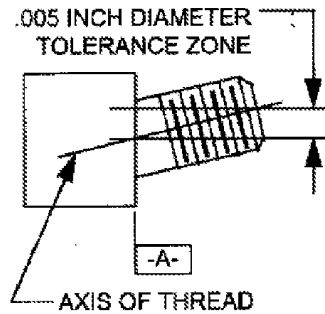
Rev. No. 00

Page 21 OF 28

6.10.3. Thread Axis

Thread axis shall have the following perpendicularity over the full thread length except for tapped holes in punched parts.

\perp	$\varnothing .005$	A
---------	--------------------	---



6.10.4. Tap Drill Depths For Blind Holes

6.10.4.1. Screw Threads

All threads are to meet standards specified in the "American Standard For Unified Screw Threads."

Class 2A for external threads.

Class 2B for internal threads.

6.10.4.2. Acceptance Standards For Tapped Holes

6.10.4.2.1. Visual Inspection

The following are not acceptable:

Burrs, Slivers, Upset Threads, Ripped or Torn Threads, Stripped Threads, Chatter.

6.10.4.2.2. Gage Check.

To be done with Class 2B gages.

Clean threads if necessary to remove any dirt, chips, splinters, and other foreign material before running gage check.

A) Go gage must enter tapped hole freely and completely

B) No-go gage must not enter more than three (3) turns.

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.



PRODUCT STANDARD

HYDERABAD

Prod. Std. No. GT11220

Rev. No. 00

Page 22 OF 28

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED.
It must not be used directly or indirectly in any way detrimental to the interest of the company.

Ref.Doc.

348A9200 REV/M

Tap Drill Depths in Blind Tapped Holes

TAP SIZE	TAP DRILL DIAMETER	DRILL DEPTH TO BE ADDED TO FULL LENGTH OF THREAD	
		"A" PLUG TAP	"B" BOTTOM TAP
COURSE THREAD SERIES			
5-40	#38 (.1015)	.156	.094
6-32	#36 (.1065)	.188	.094
8-32	#29 (.136)	.188	.094
10-32	#20 (.161)	.250	.125
.250-20	#6 (.204)	.312	.156
.312-18	.266	.344	.188
.375-16	.312	.375	.188
.500-13	.422	.469	.250
.625-11	.531	.562	.250
.750-10	.656	.625	.312
.875-9	.766	.688	.312
1-8	.875	.750	.375
1.250-7	1.109	.750	.438
1.250-8	1.125	.750	.375
1.500-6	1.344	1.125	.500
1.500-8	1.375	.875	.375
1.750-5	1.547	1.344	.625
1.750-8	1.625	.875	.375
2-4.5	1.781	1.469	.688
2-8	1.875	.875	.375
2.250-4.5	2.031	1.469	.688
2.250-8	2.125	.875	.375
2.500-4	2.250	1.750	.750
2.500-8	2.375	1.000	.375
2.750-4	2.500	1.750	.750
2.750-8	2.625	1.000	.375
FINE THREAD SERIES			
.250-28	#3 (.213)	.312	.156
.312-24	.266	.344	.188
.375-24	.328	.375	.188
.500-24	.453	.469	.250
.625-18	.578	.562	.250
.750-16	.688	.625	.312
.875-14	.812	.688	.312
1-14	.938	.750	.375



PRODUCT STANDARD

HYDERABAD

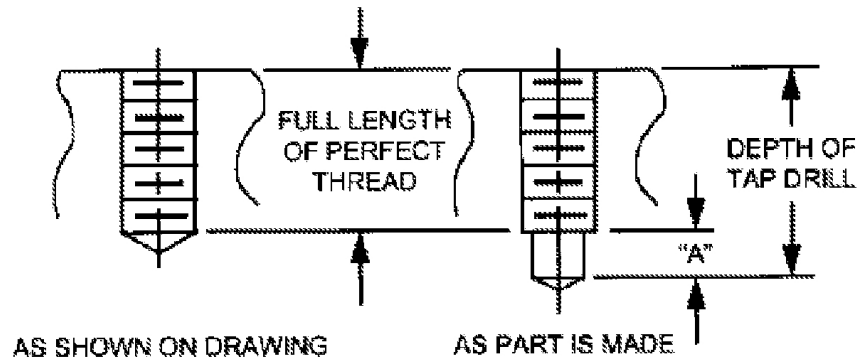
Prod. Std. No. GT11220

Rev. No. 00

Page 23 OF 28

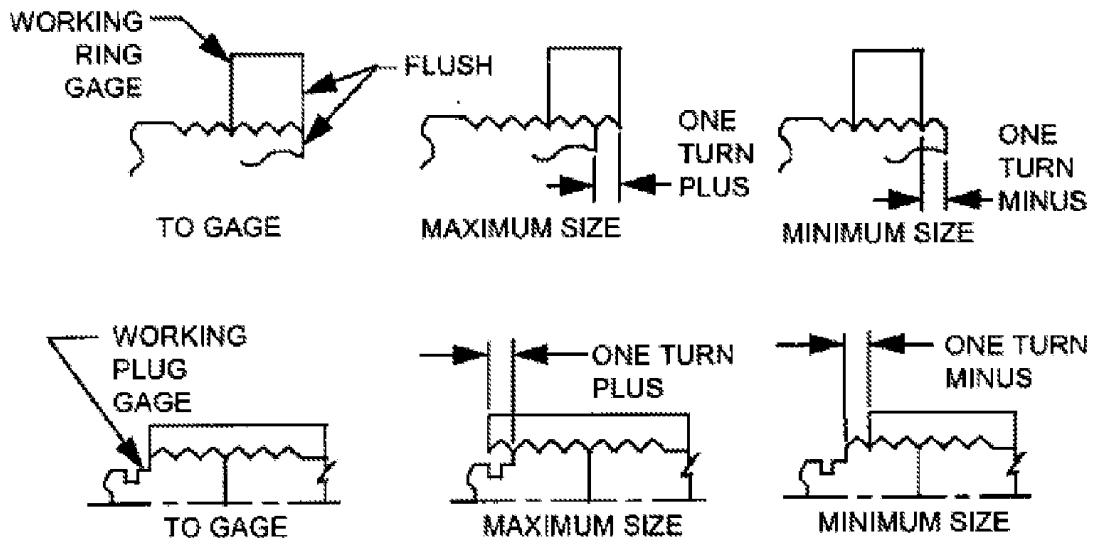
COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.



6.10.5. Pipe Threads

All pipe threads are to meet American National Standards Institute (ANSI) Taper Pipe Thread standards and are to be checked with the correct working ring or plug gage. Allowable tolerance will be plus or minus one turn. All pipe tapped holes should be reamed before tapping with a reamer having a taper of .75 inches per foot.





PRODUCT STANDARD

HYDERABAD

Prod. Std. No. GT11220

Rev. No. 00

Page 24 OF 28

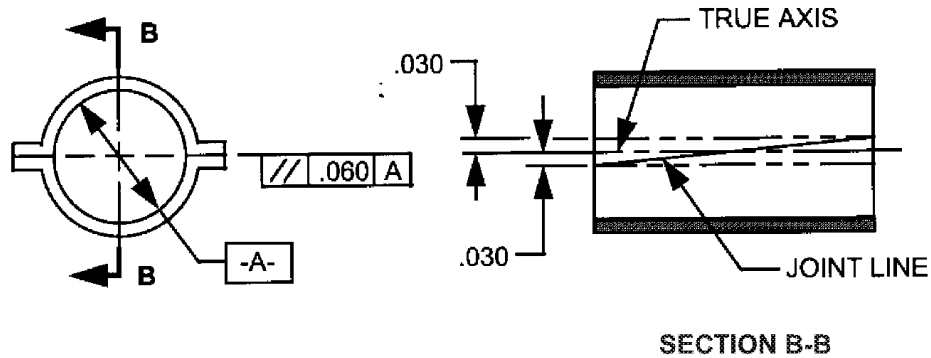
COPYRIGHT AND CONFIDENTIAL



The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED.
It must not be used directly or indirectly in any way detrimental to the interest of the company.


Nominal Pipe Size	Number Of Threads Per Inch	Length Of Hand-Tight Engagement	Outside Diameter Of Pipe	Tap Drill Diameter (Allows Matl. For Reaming)	Tap Drill Depth +.125 -0	Min. Dia. At Large End Of Reamed Hole	Max. Dia. At Large End Of Reamed Hole
.062	27	.160	.312	.242	.594	.251	.256
.125	27	.180	.405	.328	.594	.343	.348
.250	18	.200	.540	.422	.781	.442	.449
.375	18	.240	.675	.562	.812	.579	.586
.500	14	.320	.840	.688	1.031	.717	.726
.750	14	.339	1.050	.891	1.031	.927	.936
1.000	11.5	.400	1.315	1.125	1.250	1.164	1.175
1.250	11.5	.420	1.660	1.469	1.281	1.508	1.519
1.500	11.5	.420	1.900	1.719	1.312	1.747	1.758
2.000	11.5	.436	2.375	2.188	1.594	2.221	2.232
2.500	8	.682	2.875	2.594	1.844	2.654	2.669
3.000	8	.766	3.500	3.250	1.906	3.281	3.296
3.500	8	.821	4.000	3.750	2.000	3.781	3.796
4.000	8	.844	4.500	4.250	2.062	4.281	4.296
5.000	8	.937	5.563	5.250	2.188	5.341	5.356
6.000	8	.958	6.625	6.250	2.312	6.398	6.403
8.000	8	1.063	8.625	8.250	2.500	8.392	8.407

6.11. Horizontal Joint

Horizontal joints of split casings must coincide with the plane of the true horizontal axis within $\pm .030$ inches for the full length.



TD -106 -1 Rev. No. 5 Form No.		<h1 style="text-align: center;">PRODUCT STANDARD</h1> <h2 style="text-align: center;">HYDERABAD</h2>	Prod. Std. No. GT11220
			Rev. No. 00
			Page 25 OF 28
<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> <p style="writing-mode: vertical-rl; transform: rotate(180deg);"> COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company. </p> </div> <div style="width: 80%;"> <p>To assure the flatness of horizontal joints when it is necessary to transport finished machined casings via commercial carriers, the two halves will be bolted firmly together where practical from a size standpoint. Where shipping limits are prohibitive, other provisions will be made to stabilize the joint.</p> <p>6.12. Alignment – Dowels Dowel holes reamed with hand tools at final assembly shall be 63 microinches.</p> <p>Dowels machined to suit the above holes shall fit diametrically within .0005 inches interference and .0005 inches loose.</p> <p>A flat may be ground for the entire length of the dowel. The flat shall be .125 inches maximum width on .25 inch and larger diameter dowels and .062 inches maximum width on .188 and .125 diameter dowels.</p> <p>6.13. "Critical To Quality" (former practice: "Key Quality Characteristics")</p> <p>6.13.1 General It is important to strive to meet all drawing tolerances because deviations beyond tolerance result in potential cost increases. However, it is necessary to apply the maximum effort to those features that are essential for success of the component during manufacture, assembly, and operation. These "Critical To Quality" characteristics (former practice: "Key Quality Characteristics") have been identified on some drawings by cross-functional teams led by Design Engineering.</p> <p>6.13.2. Definitions <u>Characteristic:</u> The dimensional, visual, functional, mechanical, and material features or properties which describe and constitute the design of an item and can be measured, observed, or identified to determine conformance to the design requirements.</p> <p><u>"Critical To Quality" (former practice: "Key Quality Characteristic"):</u> Those characteristics of an item which, if nonconforming, may prevent or seriously affect the unit performance, reliability, producibility, or customer satisfaction of a component.</p> <p>6.13.3 Symbol The following symbol is used to identify "Critical To Quality" (former practice: "Key Quality Characteristics") on engineering drawings and specifications. The symbol may be applied to dimensions, geometric tolerance controls, surface roughness, notes, and specifications.</p> <div style="text-align: center; margin-top: 20px;">  </div> </div> </div>			
Ref.Doc.	348A9200 REV01		

TD -106 -1 Rev. No. 5 Form No.		<h1 style="text-align: center;">PRODUCT STANDARD</h1> <h2 style="text-align: center;">HYDERABAD</h2>		Prod. Std. No. GT11220
				Rev. No. 00
				Page 26 OF 28

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

Former Practice (KQC).

KQC

6.13.4 Requirements

The manufacturing operations require special attention for characteristics identified as "Critical To Quality" (former practice: "Key Quality Characteristics"). It is essential that these features meet the described drawing requirements. The actual part dimensions should be recorded and used to:

- A) Monitor process stability.
- B) Determine and remove special causes of variation.
- C) Center processes on nominal/target.
- D) Improve process capability by reducing common cause variability.

6.14. Vendor Requirements for Steam Turbine and Electric Generator Components.

All vendor purchased steam turbine components must meet preservation requirements of P23E-AL-0200.

All vendor purchased electric generator components shall meet preservation requirements of P6A-AL-5038.

FABRICATIONS

The following tolerances shall be applied to drawing dimensions for fabrication parts where no other tolerances are specified. These parts may be burned, sheared, sawed, etc.. Surface roughness is typically rougher than 500 microinches.


MATERIAL THICKNESS (INCHES)	LENGTH (INCHES)		
	0 TO 24	OVER 24 TO 48	OVER 48
	TOLERANCE (INCHES)		
0 TO 2.00	± .06	± .06	± .09
OVER 2.00 TO 3.00	± .09	± .09	± .12
OVER 3.00 TO 4.00	± .12	± .16	± .19
OVER 4.00 TO 7.50	± .19	± .25	± .25


1) Tolerance on dimensions: Include angle of cut with the plate surface.

2) Straightness: No part of a nominally straight edge shall vary from a straight line by more than 1/16 inch per foot.

Ref.Doc.

348A9200 REV'M

TD -106 -1	Rev. No. 5 Form No.		<h1 style="text-align: center;">PRODUCT STANDARD</h1> <h2 style="text-align: center;">HYDERABAD</h2>	<table border="1"> <tr> <td>Prod. Std. No.</td> <td>GT11220</td> </tr> <tr> <td>Rev. No.</td> <td>00</td> </tr> <tr> <td>Page</td> <td>27 OF 28</td> </tr> </table>	Prod. Std. No.	GT11220	Rev. No.	00	Page	27 OF 28
Prod. Std. No.	GT11220									
Rev. No.	00									
Page	27 OF 28									
<p style="text-align: center;">COPYRIGHT AND CONFIDENTIAL</p> <p>The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.</p>		<p>3) Parallelism: Nominally parallel surfaces shall not vary from parallel by more than 1/16 inch per foot. 4) Angularity: The tolerance of an angle, including a right angle, is 1/16 inch per foot. 5) Dimension from machined surfaces or features: See tolerances section 5.1</p> <p>8. MATERIALS</p> <p>8.1. Specifications Drawings specify material in final condition to GE specification or commercial designation when no GE specification is available.</p> <p>8.2. Material Callout The current method for specifying materials in a design is with the COPICS Bill Of Material and/or on the drawing. Drawings created before the implementation of COPICS may have materials specified on parts lists or on the drawing.</p> <p>8.3. Material Substitution</p> <p>8.3.1. Approval Substitution of material other than specified on the drawing requires Engineering approval.</p> <p>8.3.2. Obsolete Material Materials designated as obsolete or otherwise not available, may be substituted per Process Specification B50A1000-S2. This substitution may be made without Engineering approval and without the requirement to change drawings and Bill Of Material. However, the form GST-100 must be completed to record the substitution.</p> <p>8.3.3. Commercial Grade Material Commercial grade material may be substituted for GE specification material as defined in Specification D50A152. This substitution may be made without Engineering approval and without the requirement to change drawings and Bills Of Material. However, the form GST-100 must be completed to record the substitution.</p> <p>9. CLEANLINESS Power plant components identified in 362A2412, shall meet the requirements specified in 362A2412, System and Component Cleanliness Requirements.</p> <p>10. PART IDENTIFICATION Unless specifically stated on the drawing all Turbine/Generator parts should be identified per P23A-AG2.</p>								
Ref.Doc.	348A9200 REV01									

TD -106 -1 Rev. No. 5 Form No.		PRODUCT STANDARD HYDERABAD		Prod. Std. No. GT11220		
				Rev. No. 00		
				Page 28 OF 28		
RECORD OF REVISIONS						
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.	Rev. No.	Date	Revision Details	Revised	Approved	
	00		First Made	--	--	
	Ref.Doc.	348A9200 REV/M				