

**INVOICE FOR ISSUE OF
TOYOTA ENGINEERING STANDARD**

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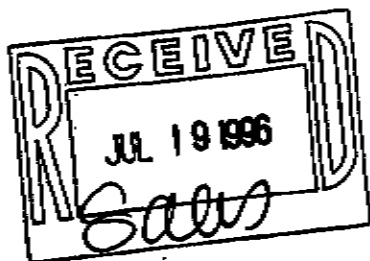
TITLE : GENERAL DIMENSIONAL TOLERANCES FOR MACHINED PARTS

CLASS : C

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TOYOTA MOTOR CORPORATION

NOTE: In the case of revision, the old standard which has been issued before should be discarded in proper manner (such as shredding or fire) to avoid possible use of obsolete standards information.

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GENERAL DIMENSIONAL TOLERANCES FOR MACHINED PARTS

1. Scope

This standard covers general permissible deviations for linear dimension and angular dimension of machined parts. Although this standard applies to dimensions for which tolerances are not individually allocated, following instances are excluded from the scope.

- (1) Dimensions covered by other standards on general tolerances (for example, general tolerances for perpendicularity)
- (2) Standardized dimensions such as included angle of a tool (for example, dimension of chisel angle of a drill)
- (3) Reference dimensions
- (4) Theoretically exact dimensions

Remark: General dimensional tolerances are effective for dimensions shown in drawings or related technical documents, for which the function requires no particular precision.

2. General Permissible Deviations for Linear Dimensions

General permissible deviations for linear dimensions shall be as given in Table 1. Hole diameter and depth, external radius (roundness), chamfer heights for broken edge, and radius of fillet, however, shall be excluded.

General permissible deviations for linear dimensions control only the actual dimensions of a feature, but not its form deviations (refer to TSZ2001G).

Table 1 General Permissible Deviations for Linear Dimensions

Tolerance class		Division of basic dimension							Unit: mm
		From 1 ⁽¹⁾ up to 3 incl.	Over 3 up to 6 incl.	Over 6 up to 30 incl.	Over 30 up to 120 incl.	Over 120 up to 400 incl.	Over 400 up to 1000 incl.	Over 1000 up to 2000 incl.	
MCA	Fine		±0.1		±0.15	±0.2	±0.3	±0.5	
MTB	Medium		±0.3		±0.5	±0.8	±1.2		
MTC	Coarse	±0.3		±0.6	±0.8	±1.2	±2	±3	

Note: (1) Tolerances for the part whose basic dimension is smaller than 1 mm shall be individually specified for each dimension directly in numerical values.

Prepared and Written by:

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3. General Permissible Deviations for Hole Diameters

General permissible deviations for hole diameters are as given in Table 2.

Table 2 General Permissible Deviations for Hole Diameters

Unit: mm

Designation	Description	Division of basic dimension			
		From 1 ⁽¹⁾ up to 3 incl.	Over 3 up to 6 incl.	Over 6 up to 30 incl.	Over 30 up to 120 incl.
MTA Fine	Fine	+0.1	+0.15	+0.2	+0.25
		-0.1	-0.1	-0.1	-0.1
MTB Medium	Medium	+0.2	+0.3	+0.4	+0.5
		-0.1	-0.1	-0.15	-0.15
MTC Coarse	Coarse	+0.4	+0.6	+0.8	+1.0
		-0.1	-0.1	-0.2	-0.2

Note:(2) Tolerances for the part whose basic dimension is smaller than 1 mm shall be individually specified for each dimension directly in numerical values.

4. General Permissible Deviations for Hole Depth

General permissible deviations for hole depth shall be as given in Table 3.

General permissible deviations for the length of complete threads of a threaded hole shall be of a pitch of ± 2.5

Table 3 General Permissible Deviations for Hole Depth

Unit: mm

Designation	Description	Division of basic dimension			
		From 1 ⁽¹⁾ up to 6 incl.	Over 6 up to 30 incl.	Over 30 up to 120 incl.	Over 120 up to 400 incl.
MTA Fine	Fine	± 0.2		± 0.3	± 0.5
MTB Medium	Medium	± 0.5	± 0.8	± 1.0	± 1.2
MTC Coarse	Coarse	± 0.6	± 1.0	± 1.8	± 2.5

Note:(3) Tolerances for the part whose basic dimension is smaller than 1 mm shall be individually specified for each dimension directly in numerical values.

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5. General Permissible Deviations for External Radius and Chamfer Heights for Broken Edge
 General permissible deviations for external radius and chamfer heights for broken edge are as given in Table 4. This standard, however, is not applicable to the radius and chamfer heights for broken edge of the part with its surface left as forged.

Table 4 General Permissible Deviations for External Radius and Chamfer Heights for Broken Edge

Unit: mm

Tolerance class		Division of basic dimension		
Designation	Description	From 0.5 ⁽⁴⁾ up to 3 incl.	Over 3 up to 6 incl.	Over 6
MTA	Fine	± 0.2	± 0.5	± 1.0
MTB	Medium	± 0.4	± 1.0	± 2.0
MTC	Coarse			

Note:(4) Tolerances for the part whose basic dimension is smaller than 0.5 mm shall be individually specified for each dimension directly in numerical values. Thread chamfer, however, is excluded. Thread chamfer refers to the breakage of edge under 0.5 mm, and the chamfer must be acknowledged.

The basic dimension for external radius and chamfer heights for broken edge are the length of a side of a workpiece of which an edge is to be bevelled (Figs. 1 and 2).

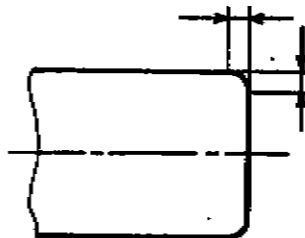


Fig. 1 Basic Size for External Radius

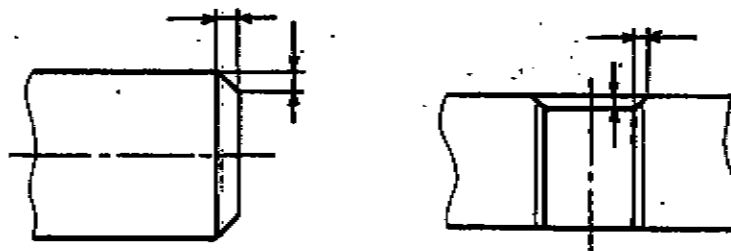


Fig. 2 Basic Size for Chamfer Heights for Broken Edge

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8. General Permissible Deviations for Radius of Fillets
 General permissible deviations for radius of fillets are as given in Table 5. The radius shall be in a gradient of 20° or less with respect to a plane or a curve (refer to Fig. 3).

Table 5 General Permissible Deviations for Radius of Fillets

Unit: mm

Tolerance class		Division of basic dimension		
Designation	Description	From 0.5 ⁽¹⁾ up to 3 incl.	Over 3 up to 6 incl.	Over 6
MTA	Fine	±0.1	±0.2	±0.5
MTB	Medium	±0.2	±0.5	±1.0
MTC	Coarse	±0.4	±1.0	±2.0

Note:(5) Tolerances for the part whose basic dimension is smaller than 0.5 mm shall be individually specified for each dimension directly in numerical values.

Remark: Standard values for radius of fillets shall be 0.5, 0.8, 1, 1.2, 1.6, 2, 2.5, 3, 4, 5, 6, 8, 10, 12, 16, 20, 25, 30, 40 and 50.

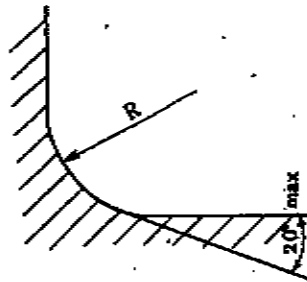


Fig. 3 Limit Value for the Gradient of Radius with Respect to a Plane or a Curve

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7. General Permissible Deviations for Angular Dimensions

General permissible deviations for angular dimensions shall be as given in Table 6 regardless of the tolerance on linear dimensions applied to a feature that forms an angle. The upper and lower deviations for angular dimensions do not control the form deviations of lines or line elements of surfaces which form an angle (refer to TSZ2001G). An angle, the general orientation of the line derived from the actual line or surface, is the orientation of the contacting line of ideal geometrical form, and the maximum distance between them shall be the least possible value (refer to TSZ2300G).

Table 6 General Permissible Deviations for Angular Dimensions

Tolerance class		Division of basic dimension for lengths of the shorter side of an angle				
Designation	Description	Up to 10	Over 10 up to 50 incl.	Over 50 up to 120 incl.	Over 120 up to 400 incl.	Over 400
MTA	Fine	±1°	±30'	±20'	±10'	±5'
MTB	Medium	±1° 30'	±1°	±30'	±15'	±10'
MTC	Coarse	±3°	±2°	±1°	±30'	±20'

8. Indication on Drawings

General dimensional tolerances for machined parts shall be indicated on drawings or related technical documents by the standards number of this standard, followed by the designation for the tolerance class (example: TS22207G-MTB). Only the designation for the tolerance class, however, shall be marked if indicating on the title block on the drawing (Fig. 4).

SCALE	公差方式 TOL. PRINCIPLE	普通公差 GENERAL TOL. 公差 MTB	普通公差 G.G.T.
MENT	材質 MATERIAL	通用型式(車種) MODEL	
	品名 NAME		
設計: 設計 OWNER	担当者 STAFF CODE	品番 PART. NO.	
	DATE		
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Fig. 4

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APPENDIX 1 PERMISSIBLE DIMENSIONAL DEVIATIONS FOR MACHINING

1. Scope

This Appendix 1 covers general permissible dimensional deviations for machined parts specified in already issued drawings which were subjected to the application of old standard.

It is advisable, however, that the drawing be revised by engineering change for those existing parts that mate with the parts covered by the text of this standard, such that those existing parts can also be covered by the text of this standard.

2. General Permissible Dimensional Deviations

2.1 General Permissible Deviations for Linear Dimensions

General permissible deviations for linear dimensions are as given in Appendix 1 Table 1.

Appendix 1 Table 1

Unit: mm

Division of basic dimension		Up to 3	Over 3 up to 6 incl.	Over 6 up to 10 incl.	Over 10 up to 18 incl.	Over 18 up to 30 incl.	Over 30 up to 50 incl.	Over 50 up to 80 incl.
Description	Designation							
Medium	MB	±0.3					±0.5	
Fine	MA	±0.08			±0.10			±0.15

Division of basic dimension		Over 80 up to 120 incl.	Over 120 up to 180 incl.	Over 180 up to 250 incl.	Over 250 up to 315 incl.	Over 315 up to 400 incl.	Over 400 up to 500 incl.
Description	Designation						
Medium	MB	±0.5					
Fine	MA	±0.15		±0.20			

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2.2 General Permissible Deviations for Hole Diameters

General permissible deviations for hole diameters are as given in Appendix 1-Table 2.

Appendix 1 Table 2

Unit: mm

Division of basic dimension		1 and over up to 3	Over 3 up to 6	Over 6 up to 30	Over 30 up to 50
Description	Designation	incl.	incl.	incl.	incl.
Medium	MB	+0.20 -0.10	+0.30 -0.10	+0.40 -0.15	+0.50 -0.15
Fine	MA	+0.10 -0.10	+0.15 -0.10	+0.20 -0.15	+0.25 -0.15

2.3 General Permissible Deviations for Hole Depth

General permissible deviations for hole depth are as given in Appendix 1 Table 3.

Appendix 1 Table 3

Unit: mm

Division of basic dimension		Up to 30	Over 30 up to 120	Over 120 up to 315	Over 315
Description	Designation		incl.	incl.	
Medium	MB		±0.8	±1.2	±2
Fine	MA	±0.2	±0.3	±0.5	±0.8

2.4 General Permissible Deviations for Chamfered Heights for Broken Edge

General permissible deviations for chamfered heights for broken edge are as given in Appendix 1 Table 4.

Appendix 1 Table 4

Unit: mm

Nominal size	Thread chamfering	C 0.5	C 1	C 1.5	C 2	C 3
Tolerance			±0.4	±0.5		
Minimum value	(1)		—			
Maximum value	C 0.5	C 0.9	—			

Note:(1) Chamfered surfaces shall be recognizable.
Not applicable to chamfering of casting surface.

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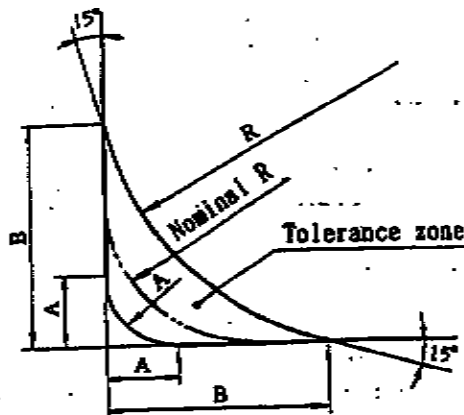
2.5 General Permissible Deviations for Radius of Fillets

General permissible deviations for radius of fillets are as given in Appendix 1 Table 5.

The dimensions A and B in Appendix 1 Table 5 shall be as given in Appendix 1 Fig. 1

Appendix 1 Table 5

Nominal size of radius	Unit: mm					
	R 0.5	R 1	R 1.5	R 2	R 3	R 5
Minimum length of R portion A	0.3	0.5	0.8	1	1.8	3.8
Maximum length of R portion B	1.5	2	2.5	3	4	6



Appendix 1 Fig. 1

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APPENDIX 2 GENERAL DIMENSIONAL TOLERANCES FOR MACHINED PARTS

1. Scope

This Appendix 2 covers general dimensional tolerances for machined parts specified in already issued drawings which were subjected to the application of TTDS 85-4.

Remark: It is desirable to change the standard to be applied from TTDS 85-4 to the Text of this standard for the drawings which were subjected to the application of TTDS 85-4, when they are issued as renewed drawing or revised drawing for the purpose of engineering change.

2. General Permissible Deviations for Linear Dimensions

Same as the Text of this standards.

3. General Permissible Deviations for Hole Diameters

Same as the Text of this standards.

4. General Permissible Deviations for Hole Depth

Same as the Text of this standards.

5. General Permissible Deviations for External Radius and Chamfer Heights for Broken Edge

Same as the Text of this standards.

6. General Permissible Deviations for Radius of Fillets

Same as the Text of this standards.

7. General Permissible Deviations for Angular Dimensions

Same as the Text of this standards.

8. Indication on Drawings

General dimensional tolerances for machined parts shall be indicated on drawings or related specifications by the standards number of TTDS and the designation for the tolerance class (example: MTB (TTDS 85-4)) .

9. Appendix

The content of Appendix in TTDS 85-4 is the same as that of Appendix 1 in TSZ2207G.

Applicable Standards

TSZ2001G Fundamental Tolerancing Principle

TSZ2300G Geometrical Tolerancing

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