

**INVOICE FOR ISSUE OF
TOYOTA ENGINEERING STANDARD**

NO. : TSZ2212G

TITLE : GENERAL DIMENSIONAL TOLERANCES FOR WELDED PARTS

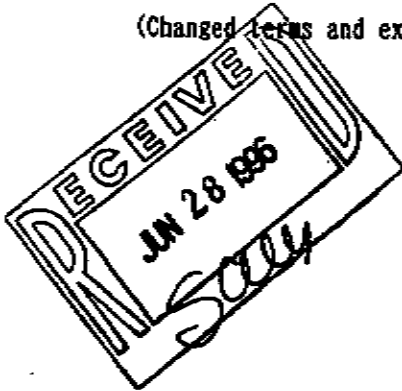
CLASS : C

PUBLICATION RECORD

(Asterisk mark "*" in this standard denotes the changed portion from previous issue.) :

Revised

(Changed terms and explanation. "*" omitted)



Date : '96. 5. 27
Engineering Information System
Planning Dept.
Engineering Administration Div.
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.

TOYOTA MOTOR MANUFACTURING USA INC. PURCHASING TECHNICAL SUPPORT
TOYOTA ENGINEERING STANDARD SUPPLIER COPY
ISSUED: <u>6/26/96</u>

3

	TOYOTA ENGINEERING STANDARD	TS Z2212G	CLASS C
---	-----------------------------	-----------	------------

GENERAL DIMENSIONAL TOLERANCES FOR WELDED PARTS

1. Scope.

This standard is intended to simplify drawing indications, and covers general tolerances in three grades for linear dimensions (e.g., external and internal dimensions, step, and center-to-center distance) and angular dimensions for welded parts. However, those under angle include those specified on drawings, and right angle and the angles of regular polygons which are not normally specified on drawings.

Length and angle dimensions, unless otherwise specified, do not restrict other technical requirements as explicated in the principle of independency specified in TSZ2001G.

If smaller tolerances are required or larger tolerances are permissible and more economical for any individual feature, such tolerances should be indicated directly in accordance with TSZ1106G.

The present standard applies to dimensions which do not have individual tolerance indications, but does not apply to the following dimensions.

- (1) Dimensions of non-rigid parts. However, those in the free and restrained conditions are excluded.
- (2) Dimensions to which separate standards apply with regard to general tolerances (e.g., general dimensional tolerances for pressed metal parts and cut parts).
- (3) Reference dimensions
- (4) Theoretically exact dimensions

Remarks: 1. General dimensional tolerances apply to dimensions for which special precision is not required for proper function on drawings, related documents, and the like.

2. General dimensional tolerances for pressed metal parts shall conform to TSZ2202G, and those for cutting parts conform to TSZ2207G.

2. Definitions

Primary technical terms used in this standard are as defined below.

Prepared and Written by:

Engineering Information System Planning Dept.

Engineering Administration Div.

Engineering Administration Div.
© TOYOTA MOTOR CORPORATION

Established / 1st Revised :
M a y 1996

NOTES: The recipient of this standard shall undertake the following confidentiality obligations upon the receipt of this standard.

* The recipient shall discard by shredding or fire, or return to Toyota Motor Corporation if appropriate, the documents contained in this standard when they are no longer necessary due to the termination of the work concerned or the revision of current version of this standard.

* This standard and the technical information related thereto are owned by and under sole control of Toyota Motor Corporation. They shall not be disclosed in whole or in part to any third party without prior written consent of Toyota Motor Corporation.



- (1) **Welded parts**
Parts resulting from uniting into a whole two or more members with heat or pressure or both so as to provide continuity between them for the purpose of fulfilling given purposes
- (2) **Free condition**
Condition of parts subject to no external forces excluding natural forces such as gravity
- (3) **Non-rigid parts**
Parts consisting of one or more parts and possible to be formed into any shape in the free condition.

3. Basic Dimension

Basic dimensions for length and angle used in this standard shall conform to Figs. 1 to 5.

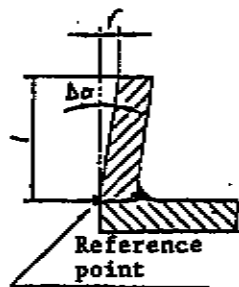


Fig. 1

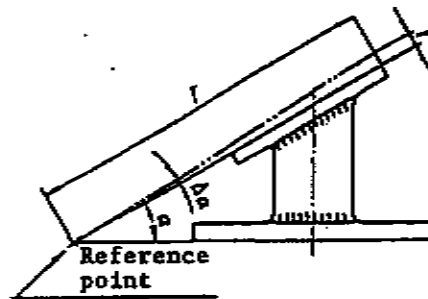


Fig. 2

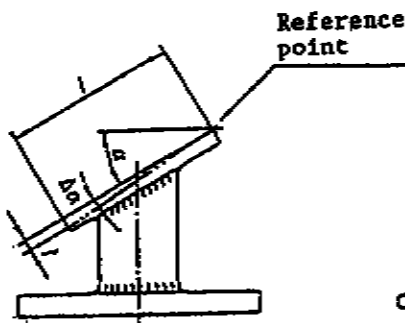


Fig. 3

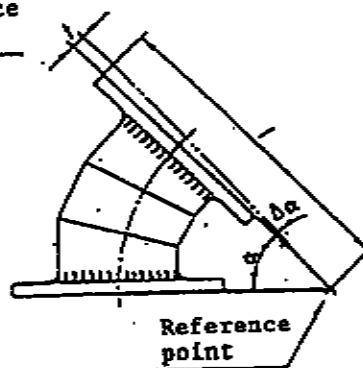


Fig. 4

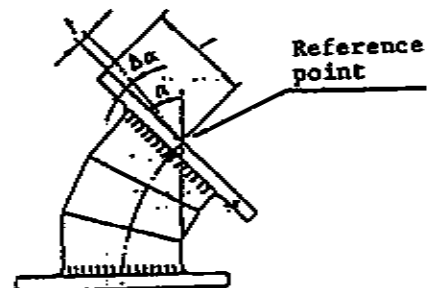


Fig. 5

4. General Tolerances for Linear Dimensions

These are graded into WIA, WTB, and WTC, whose dimensional tolerances are as specified in Table 1.

NOTES: The recipient of this standard shall undertake the following confidentiality obligations upon the receipt of this standard.
- The recipient shall discard by shredding or fire, or return to Toyota Motor Corporation if appropriate, the documents contained in this standard when they are no longer necessary due to the termination of the work concerned or the revision of current version of this standard.
- This standard and the technical information related thereto are created by and under sole control of Toyota Motor Corporation. They shall not be disclosed in whole or in part to any third party without prior written consent of Toyota Motor Corporation.

Established/ 1st Revised:
May 1996



Table 1 General Tolerances for Linear Dimensions

Unit: mm

Ranges of basic dimension	Dimensional tolerance		
	Grade		
	WTA	WTB	WTC
Over 3 to 30 incl.	±0.5	±1	
Over 30 to 120 incl.		±1	±2
Over 120 to 400 incl.	±0.7	±1.5	
Over 400 to 1000 incl.	±1	±2	±3
Over 1000 to 2000 incl.	±1.5	±3	±4
Over 2000 to 4000 incl.	±2	±4	±5
Over 4000 to 8000 incl.	±2.5	±5	±8

Remark: For basic dimensions of 3 mm or less, tolerances will be individually specified.

5. General Tolerances for Angular Dimensions

These are graded into WTA, WTB, and WTC, whose dimensional tolerances are as specified in Table 2. However, the ranges of basic dimension are based on the shorter of the feature dimensions or of the sides forming the angles. The dimension of this shorter side shall be that as measured from the reference point.

Table 2 General Dimensional Tolerances for Angle

Ranges of basic dimension (mm)	Dimensional tolerance		
	Grade		
	WTA	WTB	WTC
To 400 incl.	±20'	±45'	±1°
Over 400 to 1000 incl.	±15'	±30'	±45'
Over 1000	±10'	±20'	±30'

NOTES: The recipient of this standard shall undertake the following confidentiality obligations upon the receipt of this standard.
 * The recipient shall disclose by shredding or fire, or return to Toyota Motor Corporation if appropriate, the documents contained in this standard when they are no longer necessary due to the restrictions of the work concerned or the revision of current version of this standard.
 * This standard and the technical information related thereto are created by and under sole control of Toyota Motor Corporation. They shall not be disclosed in whole or in part to any third party without prior written consent of Toyota Motor Corporation.

Established / 1st Revised :
 May 1996



TOYOTA ENGINEERING STANDARD

TSZ2212G

6. Indication on Drawings

Indication of general dimensional tolerances for welded parts on drawings and relevant documents shall have the number and grade code of the present standard. However, in providing the indication in the title block of drawings, enter the grade code.

Example: general dimensional tolerances for welded parts:
TSZ2212G-WTB

7. Rejection

Unless otherwise stated, workpieces exceeding the general dimensional tolerances shall not lead to automatic rejection provided that the ability of the workpiece to function is not impaired.

Applicable Standards

TSZ1106G Dimensioning and Tolerancing
 TSZ2001G Fundamental Tolerancing Principle
 TSZ2202G General Dimensional Tolerances for Parts Formed From Sheet Metal
 TSZ2207G General Tolerances for Dimensions of Machined Parts

NOTES: The recipient of this standard shall undertake the following confidentiality obligations upon the receipt of this standard.
 * The recipient shall discard by shredding or fire, or return to Toyota Motor Corporation if appropriate, the documents contained in this standard when they are no longer necessary due to the completion of the work concerned or the revision of current version of this standard.
 * This standard and the technical information related thereto are owned by and under the control of Toyota Motor Corporation. They shall not be disclosed in whole or in part to any third party without prior written consent of Toyota Motor Corporation.

Established /

1st

Revised :

MAY 1996