

JIS

JAPANESE INDUSTRIAL STANDARD

Limit of Sizes and Tolerances for Metric Trapezoidal Screw Threads

JIS B 0218 —1980

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JAPANESE INDUSTRIAL STANDARD

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Limit of Sizes and Tolerances for Metric
Trapezoidal Screw Threads

B 0218-1980

1. Scope

This Japanese Industrial Standard specifies limit of sizes and tolerances for metric trapezoidal screw threads specified in JIS B 0216.

The limit of sizes and tolerances due to this standard do not apply to those with special requirements for axial displacement, for example, for lead screw.

Remark: This standard specifies the limit of sizes and tolerances for single-start metric trapezoidal screw threads with length N of thread engagement in accordance with JIS B 0217.

2. Relationship among Basic Profile, Basic Size, Root Clearance, Limit of Size, Tolerance, and Fundamental Deviation

Relationship among basic profile, basic size, root clearance, limit of size, tolerance and fundamental deviation are illustrated below.

Applicable Standards:

JIS B 0216-Metric Trapezoidal Screw Threads

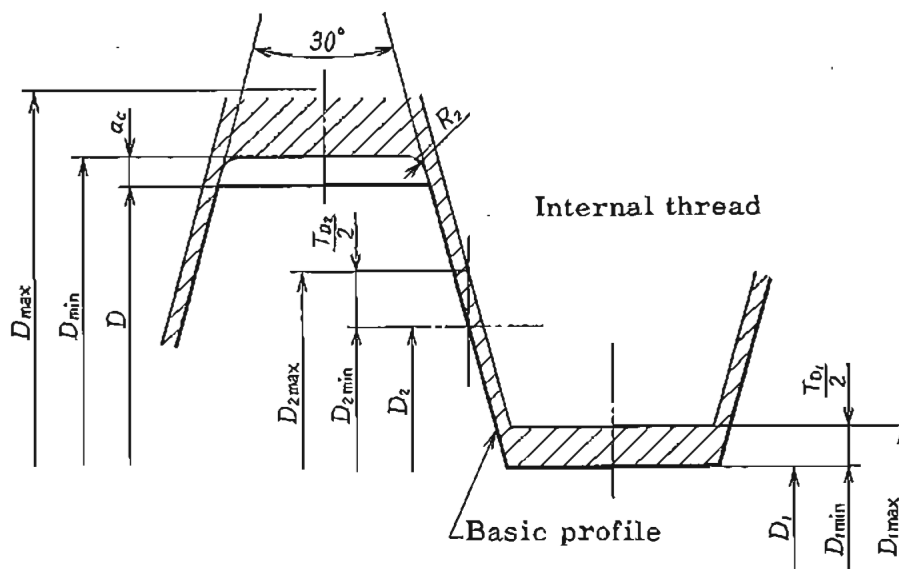
JIS B 0217-Tolerance System for Metric Trapezoidal Screw Threads

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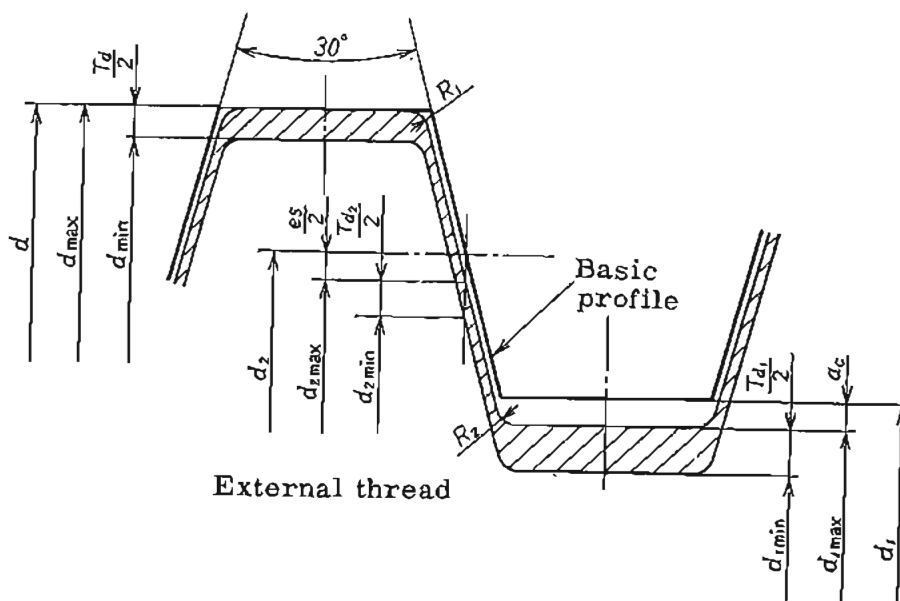
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Fig. Metric Trapezoidal Screw Thread; Showing Relationship among Basic Profile, Basic Size, Root Clearance, Limit of Size, Tolerance and Fundamental Deviation

In the case of tolerance position H of pitch diameter
($EI=0$)



In the case of tolerance position e or c of pitch diameter
($es < 0$)



Notations shown in Figure are as defined below:

- $D, D_{\max}$ and $D_{\min}$: basic size, maximum limit of size, and minimum limit of size of major diameter of internal thread
- $D_2, D_{2\max}, D_{2\min}, T_{D_2}$ and EI : basic size, maximum limit of size, minimum limit of size, tolerance and fundamental deviation of pitch diameter of internal thread
- $D_1, D_{1\max}, D_{1\min}$ and T_{D_1} : basic size, maximum limit of size, minimum limit of size, and tolerance of minor diameter of internal thread
- $d, d_{\max}, d_{\min}$ and T_d : basic size, maximum limit of size, minimum limit of size, and tolerance of major diameter of external thread
- $d_2, d_{2\max}, d_{2\min}, T_{d_2}$ and es : basic size, maximum limit of size, minimum limit of size, tolerance, and fundamental deviation of pitch diameter of external thread
- $d_1, d_{1\max}, d_{1\min}$ and Td_1 : basic size, maximum limit of size, minimum limit of size, and tolerance of minor diameter of external thread
- a_c : root clearance of internal or external thread
- R_1 : rounding of crest of external thread
- R_2 : rounding of root of internal or external thread

Bold continuous line shows the basic profile (see JIS B 0216), and the hatched area the tolerance zone of internal or external thread.

Values of D, D_2, D_1, d, d_2 and d_1 are prescribed in Table 2 of JIS B 0216, and values of a_c and R_1, R_2 in Tables 3 and 13 of JIS B 0217.

3. Tolerance Quality, Tolerance Class, Limit of Size and Tolerance

The tolerance quality of metric trapezoidal screw threads shall be classified into 2 classes, medium and coarse, and the tolerance class corresponding to the above quality shall be as given in Table 1. Limit of size and tolerance shall be as given in Table 2 to 5 according to the class given in Table 1.

Limit of size and tolerance given in Table 2 to 5 are as specified for the case where the length of thread engagement is N with single-start screw thread in accordance with JIS B 0217, but, where the length L of thread engagement is longer than N or where the screw thread is of multi-start, they shall comply with JIS B 0217.

Irrespective of tolerance quality, the combination of external and internal threads of different classes given in Table 1 may be used, as appropriate.

Table 1. Tolerance Quality, Class and Application of Metric Trapezoidal Screw Threads

Tolerance quality	Screw threads, external or internal	Tolerance class	For application, refer to:
Medium (Application, for example: screw thread of general use)	Internal thread	7 H	Table 2
	External thread	7 e	Table 3
Coarse (Application, for example: screw threads in which screw machining is found difficult)	Internal thread	8 H	Table 4
	External thread	8 c	Table 5

Table 2. Limit of Size and Tolerance for Metric Trapezoidal Screw Threads (for Internal Thread)

Tolerance quality: Medium

Tolerance class: 7 H

Unit: mm

Designation of screw thread	Fundamental deviation ⁽¹⁾ EI	Major diameter		Pitch diameter			Minor diameter			Length of thread engagement ⁽²⁾	
		$D_{\max}$	$D_{\min}$	$D_2 \max$	$D_2 \min$	T_{D_2}	$D_1 \max$	$D_1 \min$	T_{D_1}	Over	Up to and including
Tr 8×1.5	0	Unspecified	8.300	7.474	7.250	0.224	6.690	6.500	0.190	5	15
Tr 9×2			9.500	8.250	8.000	0.250	7.236	7.000	0.236	6	19
Tr 9×1.5			9.300	8.474	8.250	0.224	7.690	7.500	0.190	5	15
Tr 10×2			10.500	9.250	9.000	0.250	8.236	8.000	0.236	6	19
Tr 10×1.5			10.300	9.474	9.250	0.224	8.690	8.500	0.190	5	15
Tr 11×3			11.500	9.780	9.500	0.280	8.315	8.000	0.315	10	28
Tr 11×2			11.500	10.250	10.000	0.250	9.236	9.000	0.236	6	19
Tr 12×3			12.500	10.800	10.500	0.300	9.315	9.000	0.315	11	32
Tr 12×2			12.500	11.265	11.000	0.265	10.236	10.000	0.236	8	24
Tr 14×3			14.500	12.800	12.500	0.300	11.315	11.000	0.315	11	32
Tr 14×2			14.500	13.265	13.000	0.265	12.236	12.000	0.236	8	24
Tr 16×4			16.500	14.355	14.000	0.355	12.375	12.000	0.375	15	43
Tr 16×2			16.500	15.265	15.000	0.265	14.236	14.000	0.236	8	24
Tr 18×4			18.500	16.355	16.000	0.355	14.375	14.000	0.375	15	43
Tr 18×2			18.500	17.265	17.000	0.265	16.236	16.000	0.236	8	24
Tr 20×4			20.500	18.355	18.000	0.355	16.375	16.000	0.375	15	43
Tr 20×2			20.500	19.265	19.000	0.265	18.236	18.000	0.236	8	24
Tr 22×8			23.000	18.475	18.000	0.475	14.630	14.000	0.630	30	85
Tr 22×5			22.500	19.875	19.500	0.375	17.450	17.000	0.450	18	53
Tr 22×3			22.500	20.800	20.500	0.300	19.315	19.000	0.315	11	32
Tr 24×8			25.000	20.500	20.000	0.500	16.630	16.000	0.630	34	100
Tr 24×5			24.500	21.900	21.500	0.400	19.450	19.000	0.450	21	63
Tr 24×3			24.500	22.835	22.500	0.335	21.315	21.000	0.315	12	36
Tr 26×8			27.000	22.500	22.000	0.500	18.630	18.000	0.630	34	100
Tr 26×5			26.500	23.900	23.500	0.400	21.450	21.000	0.450	21	63
Tr 26×3			26.500	24.835	24.500	0.335	23.315	23.000	0.315	12	36
Tr 28×8			29.000	24.500	24.000	0.500	20.630	20.000	0.630	34	100
Tr 28×5			28.500	25.900	25.500	0.400	23.450	23.000	0.450	21	63
Tr 28×3			28.500	26.835	26.500	0.335	25.315	25.000	0.315	12	36
Tr 30×10			31.000	25.530	25.000	0.530	20.710	20.000	0.710	42	125
Tr 30×6			31.000	27.450	27.000	0.450	24.500	24.000	0.500	25	75
Tr 30×3			30.500	28.835	28.500	0.335	27.315	27.000	0.315	12	36
Tr 32×10			33.000	27.530	27.000	0.530	22.710	22.000	0.710	42	125
Tr 32×6			33.000	29.450	29.000	0.450	26.500	26.000	0.500	25	75
Tr 32×3			32.500	30.835	30.500	0.335	29.315	29.000	0.315	12	36
Tr 34×10			35.000	29.530	29.000	0.530	24.710	24.000	0.710	42	125
Tr 34×6			35.000	31.450	31.000	0.450	28.500	28.000	0.500	25	75
Tr 34×3			34.500	32.835	32.500	0.335	31.315	31.000	0.315	12	36
Tr 36×10			37.000	31.530	31.000	0.530	26.710	26.000	0.710	42	125
Tr 36×6			37.000	33.450	33.000	0.450	30.500	30.000	0.500	25	75
Tr 36×3			36.500	34.835	34.500	0.335	33.315	33.000	0.315	12	36

Table 2 (Continued)

Designation of screw thread	Fundamental deviation(1) <i>EI</i>	Major diameter		Pitch diameter			Minor diameter			Length of thread engagement(2)	
		<i>D</i> _{max}	<i>D</i> _{min}	<i>D</i> _{2 max}	<i>D</i> _{2 min}	<i>T</i> _{D1}	<i>D</i> _{1 max}	<i>D</i> _{1 min}	<i>T</i> _{D1}	Over	Up to and including
Tr 38×10	0	Unspecified	39.000	33.530	33.000	0.530	28.710	28.000	0.710	42	125
Tr 38×7			39.000	34.975	34.500	0.475	31.560	31.000	0.560	30	85
Tr 38×3			38.500	36.835	36.500	0.335	35.315	35.000	0.315	12	36
Tr 40×10			41.000	35.530	35.000	0.530	30.710	30.000	0.710	42	125
Tr 40×7			41.000	36.975	36.500	0.475	33.560	33.000	0.560	30	85
Tr 40×3			40.500	38.835	38.500	0.335	37.315	37.000	0.315	12	36
Tr 42×10			43.000	37.530	37.000	0.530	32.710	32.000	0.710	42	125
Tr 42×7			43.000	38.975	38.500	0.475	35.560	35.000	0.560	30	85
Tr 42×3			42.500	40.835	40.500	0.335	39.315	39.000	0.315	12	36
Tr 44×12			45.000	38.560	38.000	0.560	32.800	32.000	0.800	50	150
Tr 44×7			45.000	40.975	40.500	0.475	37.560	37.000	0.560	30	85
Tr 44×3			44.500	42.835	42.500	0.335	41.315	41.000	0.315	12	36
Tr 46×12			47.000	40.630	40.000	0.630	34.800	34.000	0.800	60	170
Tr 46×8			47.000	42.530	42.000	0.530	38.630	38.000	0.630	38	118
Tr 46×3			46.500	44.855	44.500	0.355	43.315	43.000	0.315	15	45
Tr 48×12			49.000	42.630	42.000	0.630	36.800	36.000	0.800	60	170
Tr 48×8			49.000	44.530	44.000	0.530	40.630	40.000	0.630	38	118
Tr 48×3			48.500	46.855	46.500	0.355	45.315	45.000	0.315	15	45
Tr 50×12			51.000	44.630	44.000	0.630	38.800	38.000	0.800	60	170
Tr 50×8			51.000	46.530	46.000	0.530	42.630	42.000	0.630	38	118
Tr 50×3			50.500	48.855	48.500	0.355	47.315	47.000	0.315	15	45
Tr 52×12			53.000	46.630	46.000	0.630	40.800	40.000	0.800	60	170
Tr 52×8			53.000	48.530	48.000	0.530	44.630	44.000	0.630	38	118
Tr 52×3			52.500	50.855	50.500	0.355	49.315	49.000	0.315	15	45
Tr 55×14			57.000	48.670	48.000	0.670	41.900	41.000	0.900	67	200
Tr 55×9			56.000	51.060	50.500	0.560	46.670	46.000	0.670	43	132
Tr 55×3			55.500	53.855	53.500	0.355	52.315	52.000	0.315	15	45
Tr 60×14			62.000	53.670	53.000	0.670	46.900	46.000	0.900	67	200
Tr 60×9			61.000	56.060	55.500	0.560	51.670	51.000	0.670	43	132
Tr 60×3			60.500	58.855	58.500	0.355	57.315	57.000	0.315	15	45
Tr 65×16			67.000	57.710	57.000	0.710	50.000	49.000	1.000	75	236
Tr 65×10			66.000	60.560	60.000	0.560	55.710	55.000	0.710	50	140
Tr 65×4			65.500	63.400	63.000	0.400	61.375	61.000	0.375	19	56
Tr 70×16			72.000	62.710	62.000	0.710	55.000	54.000	1.000	75	236
Tr 70×10			71.000	65.560	65.000	0.560	60.710	60.000	0.710	50	140
Tr 70×4			70.500	68.400	68.000	0.400	66.375	66.000	0.375	19	56
Tr 75×16			77.000	67.710	67.000	0.710	60.000	59.000	1.000	75	236
Tr 75×10			76.000	70.560	70.000	0.560	65.710	65.000	0.710	50	140
Tr 75×4			75.500	73.400	73.000	0.400	71.375	71.000	0.375	19	56
Tr 80×16			82.000	72.710	72.000	0.710	65.000	64.000	1.000	75	236
Tr 80×10			81.000	75.560	75.000	0.560	70.710	70.000	0.710	50	140
Tr 80×4			80.500	78.400	78.000	0.400	76.375	76.000	0.375	19	56
Tr 85×18			87.000	76.750	76.000	0.750	68.120	67.000	1.120	85	265
Tr 85×12			86.000	79.630	79.000	0.630	73.800	73.000	0.800	60	170
Tr 85×4			85.500	83.400	83.000	0.400	81.375	81.000	0.375	19	56

Table 2 (Continued)

Designation of screw thread	Fundamental deviation ⁽¹⁾ <i>EI</i>	Major diameter		Pitch diameter			Minor diameter			Length of thread engagement ⁽²⁾	
		<i>D</i> _{max}	<i>D</i> _{min}	<i>D</i> _{1 max}	<i>D</i> _{1 min}	<i>T</i> _{D1}	<i>D</i> _{2 max}	<i>D</i> _{2 min}	<i>T</i> _{D2}	Over	Up to and including
Tr 90×18	0	Unspecified	92.000	81.750	81.000	0.750	73.120	72.000	1.120	85	265
Tr 90×12			91.000	84.630	84.000	0.630	78.800	78.000	0.800	60	170
Tr 90× 4			90.500	88.400	88.000	0.400	86.375	86.000	0.375	19	56
Tr 95×18			97.000	86.800	86.000	0.800	78.120	77.000	1.120	100	300
Tr 95×12			96.000	89.670	89.000	0.670	83.800	83.000	0.800	67	200
Tr 95× 4			95.500	93.425	93.000	0.425	91.375	91.000	0.375	24	71
Tr 100×20			102.000	90.800	90.000	0.800	81.180	80.000	1.180	112	335
Tr 100×12			101.000	94.670	94.000	0.670	88.800	88.000	0.800	67	200
Tr 100× 4			100.500	98.425	98.000	0.425	96.375	96.000	0.375	24	71
Tr 105×20			107.000	95.800	95.000	0.800	86.180	85.000	1.180	112	335
Tr 105×12			106.000	99.670	99.000	0.670	93.800	93.000	0.800	67	200
Tr 105× 4			105.500	103.425	103.000	0.425	101.375	101.000	0.375	24	71
Tr 110×20			112.000	100.800	100.000	0.800	91.180	90.000	1.180	112	335
Tr 110×12			111.000	104.670	104.000	0.670	98.800	98.000	0.800	67	200
Tr 110× 4			110.500	108.425	108.000	0.425	106.375	106.000	0.375	24	71
Tr 115×22			117.000	104.850	104.000	0.850	94.250	93.000	1.250	118	355
Tr 115×14			117.000	108.710	108.000	0.710	101.900	101.000	0.900	75	236
Tr 115× 6			116.000	112.500	112.000	0.500	109.500	109.000	0.500	36	106
Tr 120×22			122.000	109.850	109.000	0.850	99.250	98.000	1.250	118	355
Tr 120×14			122.000	113.710	113.000	0.710	106.900	106.000	0.900	75	236
Tr 120× 6			121.000	117.500	117.000	0.500	114.500	114.000	0.500	36	106
Tr 125×22			127.000	114.850	114.000	0.850	104.250	103.000	1.250	118	355
Tr 125×14			127.000	118.710	118.000	0.710	111.900	111.000	0.900	75	236
Tr 125× 6			126.000	122.500	122.000	0.500	119.500	119.000	0.500	36	106
Tr 130×22			132.000	119.850	119.000	0.850	109.250	108.000	1.250	118	355
Tr 130×14			132.000	123.710	123.000	0.710	116.900	116.000	0.900	75	236
Tr 130× 6			131.000	127.500	127.000	0.500	124.500	124.000	0.500	36	106
Tr 135×24			137.000	123.900	123.000	0.900	112.320	111.000	1.320	132	400
Tr 135×14			137.000	128.710	128.000	0.710	121.900	121.000	0.900	75	236
Tr 135× 6			136.000	132.500	132.000	0.500	129.500	129.000	0.500	36	106
Tr 140×24			142.000	128.900	128.000	0.900	117.320	116.000	1.320	132	400
Tr 140×14			142.000	133.710	133.000	0.710	126.900	126.000	0.900	75	236
Tr 140× 6			141.000	137.500	137.000	0.500	134.500	134.000	0.500	36	106
Tr 145×24			147.000	133.900	133.000	0.900	122.320	121.000	1.320	132	400
Tr 145×14			147.000	138.710	138.000	0.710	131.900	131.000	0.900	75	236
Tr 145× 6			146.000	142.500	142.000	0.500	139.500	139.000	0.500	36	106
Tr 150×24			152.000	138.900	138.000	0.900	127.320	126.000	1.320	132	400
Tr 150×16			152.000	142.750	142.000	0.750	135.000	134.000	1.000	90	265
Tr 150× 6			151.000	147.500	147.000	0.500	144.500	144.000	0.500	36	106
Tr 155×24			157.000	143.900	143.000	0.900	132.320	131.000	1.320	132	400
Tr 155×16			157.000	147.750	147.000	0.750	140.000	139.000	1.000	90	265
Tr 155× 6			156.000	152.500	152.000	0.500	149.500	149.000	0.500	36	106
Tr 160×28			162.000	146.950	146.000	0.950	133.500	132.000	1.500	160	460
Tr 160×16			162.000	152.750	152.000	0.750	145.000	144.000	1.000	90	265
Tr 160× 6			161.000	157.500	157.000	0.500	154.500	154.000	0.500	36	106