

JIS

JAPANESE INDUSTRIAL STANDARD

**Metric Trapezoidal
Screw Threads**

JIS B 0216—1987

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by

Japanese Standards Association

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JAPANESE INDUSTRIAL STANDARD

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Metric Trapezoidal Screw Threads

B 0216-1987

1. Scope

This Japanese Industrial Standard specifies the combined nominal diameters and pitches, designation of screw threads, basic profiles, formulae and basic dimensions of the metric trapezoidal screw threads for general use.

Remark: The metric trapezoidal screw threads are in accordance with the ISO metric trapezoidal screw threads specified in ISO 2901, ISO 2902 and ISO 2904.

2. Combinations of Nominal Diameters and Pitches

Combinations of nominal diameters and pitches of the metric trapezoidal screw threads shall be in accordance with Table 1.

Further, in the case where a pitch other than given in this table is required for a nominal diameter, any pitch which is suitable to the object of use shall be selected from among the pitches specified in this table.

Corresponding International Standards:

ISO 2901-ISO metric trapezoidal screw threads-Basic profile and maximum material profiles

ISO 2902-ISO metric trapezoidal screw threads-General plan

ISO 2904-ISO metric trapezoidal screw threads-Basic dimensions

Table 1. Combinations of Nominal Diameters and Pitches of Trapezoidal Screw Threads

Unit: mm

Nominal diameters(1)			Pitches (2)																					
Column 1	Column 2	Column 3	44	40	36	32	28	24	22	20	18	16	14	12	10	9	8	7	6	5	4	3	2	1.5
8	9																							1.5
10																						2	1.5	
																							2	1.5
12	11																					3	2	
	14																					3	2	
																						3	2	
16	18																				4		2	
																					4		2	
20																					4		2	
	22																8			5		3		
24	26																8			5		3		
																	8			5		3		
28	30																8			5		3		
															10				6			3		
32															10				6			3		
	34														10				6			3		
36	38														10				6			3		
															10				6			3		
															10			7				3		
40	42														10				7			3		
															10				7			3		
44														12					7			3		
	46													12			8					3		
48	50													12			8					3		
														12			8					3		
														12			8					3		
52	55													12			8					3		
													14			9						3		
60													14			9						3		
	65											16			10						4			
70	75											16			10						4			
												16			10						4			
												16			10						4			
80	85											16			10						4			
											18			12							4			
90											18			12							4			
	95											18			12						4			
100	105									20				12							4			
										20				12							4			
										20				12							4			
	110									20				12							4			
120	115								22				14							6				
									22				14							6				
									22				14							6				
	130								22				14							6				
	135												14							6				
													14							6				
													14							6				
140	145								24				14							6				
									24				14							6				
									24				14							6				
	150											16								6				
	155								24				16							6				
													16							6				
													16							6				
160	165						28													6				
							28													6				
																				6				

Table 1. (Continued)

Unit: mm

Nominal diameters (1)			Pitches (2)																					
Column 1	Column 2	Column 3	41	40	36	32	28	24	22	20	18	16	14	12	10	9	8	7	6	5	4	3	2	1.5
180	170	175					28					16							6					
						28					16						8							
						28				18								8						
	185	190				32					18							8						
					32					18							8							
	195				32					18							8							
200	210				32					18							8							
220				36				20					8											
				36				20					8											
240	230				36					20								8						
				36				22									8							
	250			40				22					12											
260	270			40					22					12										
280				40				24					12											
				40				24						12										
300	290		44					24						12										
			44					24					12											

Notes (1) Column 1 shall be given the first priority, and then those of Column 2 and Column 3 shall be chosen in this order, as required. The screw threads of Column 3 shall not be used for machines of a new design.

(2) Those of pitches enclosed in bold lines shall be chosen preferentially.

3. Designation of Metric Trapezoidal Screw Threads

3.1 Designation of One-Start Screw Threads The designation of the one-start metric trapezoidal screw threads shall be expressed by the combination of the symbol Tr indicating the type of screw threads and numerals (in mm unit) indicating nominal diameter and pitch as given in the following example.

Example: (for nominal diameter 40 mm and pitch 7 mm) Tr 40 x 7

3.2 Designation of Multi-Start Screw Threads The designation of the multi-start trapezoidal screw threads shall be expressed by the combination of the symbol Tr indicating the type of screw threads and numerals (in mm unit) indicating nominal diameter, lead and pitch as given in the following example.

Furthermore, the pitch, in this case, shall be appended with the letter of P before its numeral and be indicated in parentheses after the lead.

Example: (For nominal diameter 40 mm, lead 14 mm, pitch 7 mm)
Tr 40 x 14 (P7)

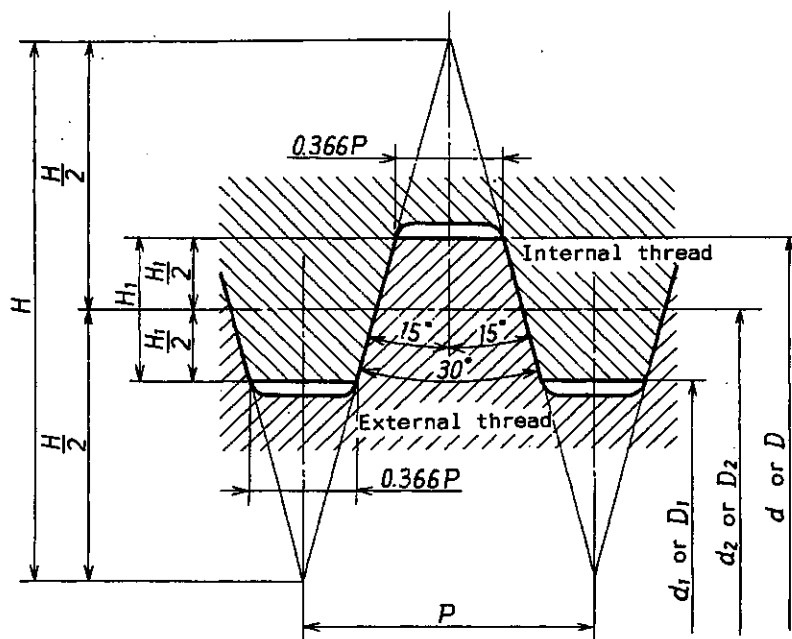
3.3 Designation of Left Hand Screw Threads The designation of the left hand metric trapezoidal screw threads shall be expressed attaching the symbol of LH after the designation specified in 3.1 or 3.2.

Example: Tr 40 x 7 LH, Tr 40 x 14 (P7) LH

4. Basic Profile, Formulae and Basic Dimensions

4.1 Basic Profile The basic profile of the metric trapezoidal screw threads shall be as given enclosed in the bold full lines in Figure.

Figure. Basic Profile of Metric Trapezoidal Screw Threads



4.2 Formulae The formulae used for calculation of the basic dimensions of metric trapezoidal screw threads shall be in accordance with the following:

$$\begin{aligned} H &= 1.866P & d_1 &= d - 0.5P & D &= d \\ H_1 &= 0.5P & d_1 &= d - P & D_1 &= d_2 \\ & & & & D_1 &= d_1 \end{aligned}$$

4.3 Basic Dimensions The basic dimensions of metric trapezoidal screw threads shall be in accordance with Table 2.

Table 2. Basic Dimensions of Metric Trapezoidal Screw Threads
Unit: mm

Designation of screw thread ⁽³⁾	Pitch P	Height of engagement H_1	Internal thread		
			Major diameter D	Pitch diameter D_2	Minor diameter D_1
			External thread		
			Full diameter d	Pitch diameter d_2	Minor diameter d_1
Tr 8×1.5	1.5	0.75	8.000	7.250	6.500
Tr 9×2	2	1	9.000	8.000	7.000
Tr 9×1.5	1.5	0.75	9.000	8.250	7.500
Tr 10×2	2	1	10.000	9.000	8.000
Tr 10×1.5	1.5	0.75	10.000	9.250	8.500
Tr 11×3	3	1.5	11.000	9.500	8.000
Tr 11×2	2	1	11.000	10.000	9.000
Tr 12×3	3	1.5	12.000	10.500	9.000
Tr 12×2	2	1	12.000	11.000	10.000
Tr 14×3	3	1.5	14.000	12.500	11.000
Tr 14×2	2	1	14.000	13.000	12.000
Tr 16×4	4	2	16.000	14.000	12.000
Tr 16×2	2	1	16.000	15.000	14.000
Tr 18×4	4	2	18.000	16.000	14.000
Tr 18×2	2	1	18.000	17.000	16.000
Tr 20×4	4	2	20.000	18.000	16.000
Tr 20×2	2	1	20.000	19.000	18.000
Tr 22×8	8	4	22.000	18.000	14.000
Tr 22×5	5	2.5	22.000	19.500	17.000
Tr 22×3	3	1.5	22.000	20.500	19.000
Tr 24×8	8	4	24.000	20.000	16.000
Tr 24×5	5	2.5	24.000	21.500	19.000
Tr 24×3	3	1.5	24.000	22.500	21.000
Tr 26×8	8	4	26.000	22.000	18.000
Tr 26×5	5	2.5	26.000	23.500	21.000
Tr 26×3	3	1.5	26.000	24.500	23.000
Tr 28×8	8	4	28.000	24.000	20.000
Tr 28×5	5	2.5	28.000	25.500	23.000
Tr 28×3	3	1.5	28.000	26.500	25.000
Tr 30×10	10	5	30.000	25.000	20.000
Tr 30×6	6	3	30.000	27.000	24.000
Tr 30×3	3	1.5	30.000	28.500	27.000
Tr 32×10	10	5	32.000	27.000	22.000
Tr 32×6	6	3	32.000	29.000	26.000
Tr 32×3	3	1.5	32.000	30.500	29.000
Tr 34×10	10	5	34.000	29.000	24.000
Tr 34×6	6	3	34.000	31.000	28.000
Tr 34×3	3	1.5	34.000	32.500	31.000
Tr 36×10	10	5	36.000	31.000	26.000
Tr 36×6	6	3	36.000	33.000	30.000
Tr 36×3	3	1.5	36.000	34.500	33.000
Tr 38×10	10	5	38.000	33.000	28.000
Tr 38×7	7	3.5	38.000	34.500	31.000
Tr 38×3	3	1.5	38.000	36.500	35.000

Table 2. (Continued)

Unit: mm

Designation of screw thread ⁽³⁾	Pitch <i>P</i>	Height of engagement <i>H₁</i>	Internal thread		
			Major diameter <i>D</i>	Pitch diameter <i>D₂</i>	Minor diameter <i>D₁</i>
			External thread		
			Full diameter <i>d</i>	Pitch diameter <i>d₂</i>	Major diameter <i>d₁</i>
Tr 40×10	10	5	40.000	35.000	30.000
Tr 40×7	7	3.5	40.000	36.500	33.000
Tr 40×3	3	1.5	40.000	38.500	37.000
Tr 42×10	10	5	42.000	37.000	32.000
Tr 42×7	7	3.5	42.000	38.500	35.000
Tr 42×3	3	1.5	42.000	40.500	39.000
Tr 44×12	12	6	44.000	38.000	32.000
Tr 44×7	7	3.5	44.000	40.500	37.000
Tr 44×3	3	1.5	44.000	42.500	41.000
Tr 46×12	12	6	46.000	40.000	34.000
Tr 46×8	8	4	46.000	42.000	38.000
Tr 46×3	3	1.5	46.000	44.500	43.000
Tr 48×12	12	6	48.000	42.000	36.000
Tr 48×8	8	4	48.000	44.000	40.000
Tr 48×3	3	1.5	48.000	46.500	45.000
Tr 50×12	12	6	50.000	44.000	38.000
Tr 50×8	8	4	50.000	46.000	42.000
Tr 50×3	3	1.5	50.000	48.500	47.000
Tr 52×12	12	6	52.000	46.000	40.000
Tr 52×8	8	4	52.000	48.000	44.000
Tr 52×3	3	1.5	52.000	50.500	49.000
Tr 55×14	14	7	55.000	48.000	41.000
Tr 55×9	9	4.5	55.000	50.500	46.000
Tr 55×3	3	1.5	55.000	53.500	52.000
Tr 60×14	14	7	60.000	53.000	46.000
Tr 60×9	9	4.5	60.000	55.500	51.000
Tr 60×3	3	1.5	60.000	58.500	57.000
Tr 65×16	16	8	65.000	57.000	49.000
Tr 65×10	10	5	65.000	60.000	55.000
Tr 65×4	4	2	65.000	63.000	61.000
Tr 70×16	16	8	70.000	62.000	54.000
Tr 70×10	10	5	70.000	65.000	60.000
Tr 70×4	4	2	70.000	68.000	66.000
Tr 75×16	16	8	75.000	67.000	59.000
Tr 75×10	10	5	75.000	70.000	65.000
Tr 75×4	4	2	75.000	73.000	71.000
Tr 80×16	16	8	80.000	72.000	64.000
Tr 80×10	10	5	80.000	75.000	70.000
Tr 80×4	4	2	80.000	78.000	76.000
Tr 85×18	18	9	85.000	76.000	67.000
Tr 85×12	12	6	85.000	79.000	73.000
Tr 85×4	4	2	85.000	83.000	81.000
Tr 90×18	18	9	90.000	81.000	72.000
Tr 90×12	12	6	90.000	84.000	78.000
Tr 90×4	4	2	90.000	88.000	86.000

Table 2. (Continued)

Unit: mm

Designation of screw thread ⁽³⁾	Pitch <i>P</i>	Height of engagement <i>H₁</i>	Internal thread		
			Major diameter <i>D</i>	Pitch diameter <i>D₂</i>	Minor diameter <i>D₁</i>
			External thread		
			Full diameter <i>d</i>	Pitch diameter <i>d₂</i>	Major diameter <i>d₁</i>
Tr 95×18	18	9	95.000	86.000	77.000
Tr 95×12	12	6	95.000	89.000	83.000
Tr 95× 4	4	2	95.000	93.000	91.000
Tr 100×20	20	10	100.000	90.000	80.000
Tr 100×12	12	6	100.000	94.000	88.000
Tr 100× 4	4	2	100.000	98.000	96.000
Tr 105×20	20	10	105.000	95.000	85.000
Tr 105×12	12	6	105.000	99.000	93.000
Tr 105× 4	4	2	105.000	103.000	101.000
Tr 110×20	20	10	110.000	100.000	90.000
Tr 110×12	12	6	110.000	104.000	98.000
Tr 110× 4	4	2	110.000	108.000	106.000
Tr 115×22	22	11	115.000	104.000	93.000
Tr 115×14	14	7	115.000	108.000	101.000
Tr 115× 6	6	3	115.000	112.000	109.000
Tr 120×22	22	11	120.000	109.000	98.000
Tr 120×14	14	7	120.000	113.000	106.000
Tr 120× 6	6	3	120.000	117.000	114.000
Tr 125×22	22	11	125.000	114.000	103.000
Tr 125×14	14	7	125.000	118.000	111.000
Tr 125× 6	6	3	125.000	122.000	119.000
Tr 130×22	22	11	130.000	119.000	108.000
Tr 130×14	14	7	130.000	123.000	116.000
Tr 130× 6	6	3	130.000	127.000	124.000
Tr 135×24	24	12	135.000	123.000	111.000
Tr 135×14	14	7	135.000	128.000	121.000
Tr 135× 6	6	3	135.000	132.000	129.000
Tr 140×24	24	12	140.000	128.000	116.000
Tr 140×14	14	7	140.000	133.000	126.000
Tr 140× 6	6	3	140.000	137.000	134.000
Tr 145×24	24	12	145.000	133.000	121.000
Tr 145×14	14	7	145.000	138.000	131.000
Tr 145× 6	6	3	145.000	142.000	139.000
Tr 150×24	24	12	150.000	138.000	126.000
Tr 150×16	16	8	150.000	142.000	134.000
Tr 150× 6	6	3	150.000	147.000	144.000
Tr 155×24	24	12	155.000	143.000	131.000
Tr 155×16	16	8	155.000	147.000	139.000
Tr 155× 6	6	3	155.000	152.000	149.000
Tr 160×28	28	14	160.000	146.000	132.000
Tr 160×16	16	8	160.000	152.000	144.000
Tr 160× 6	6	3	160.000	157.000	154.000
Tr 165×28	28	14	165.000	151.000	137.000
Tr 165×16	16	8	165.000	157.000	149.000
Tr 165× 6	6	3	165.000	162.000	159.000

Table 2. (Continued)

Unit: mm

Designation of screw thread(3)	Pitch <i>P</i>	Height of engagement <i>H₁</i>	Internal thread		
			Major diameter <i>D</i>	Pitch diameter <i>D₂</i>	Minor diameter <i>D₁</i>
			External thread		
			Full diameter <i>d</i>	Pitch diameter <i>d₂</i>	Major diameter <i>d₁</i>
Tr 170×28	28	14	170.000	156.000	142.000
Tr 170×16	16	8	170.000	162.000	154.000
Tr 170× 6	6	3	170.000	167.000	164.000
Tr 175×28	28	14	175.000	161.000	147.000
Tr 175×16	16	8	175.000	167.000	159.000
Tr 175× 8	8	4	175.000	171.000	167.000
Tr 180×28	28	14	180.000	166.000	152.000
Tr 180×18	18	9	180.000	171.000	162.000
Tr 180× 8	8	4	180.000	176.000	172.000
Tr 185×32	32	16	185.000	169.000	153.000
Tr 185×18	18	9	185.000	176.000	167.000
Tr 185× 8	8	4	185.000	181.000	177.000
Tr 190×32	32	16	190.000	174.000	158.000
Tr 190×18	18	9	190.000	181.000	172.000
Tr 190× 8	8	4	190.000	186.000	182.000
Tr 195×32	32	16	195.000	179.000	163.000
Tr 195×18	18	9	195.000	186.000	177.000
Tr 195× 8	8	4	195.000	191.000	187.000
Tr 200×32	32	16	200.000	184.000	168.000
Tr 200×18	18	9	200.000	191.000	182.000
Tr 200× 8	8	4	200.000	196.000	192.000
Tr 210×36	36	18	210.000	192.000	174.000
Tr 210×20	20	10	210.000	200.000	190.000
Tr 210× 8	8	4	210.000	206.000	202.000
Tr 220×36	36	18	220.000	202.000	184.000
Tr 220×20	20	10	220.000	210.000	200.000
Tr 220× 8	8	4	220.000	216.000	212.000
Tr 230×36	36	18	230.000	212.000	194.000
Tr 230×20	20	10	230.000	220.000	210.000
Tr 230× 8	8	4	230.000	226.000	222.000
Tr 240×36	36	18	240.000	222.000	204.000
Tr 240×22	22	11	240.000	229.000	218.000
Tr 240× 8	8	4	240.000	236.000	232.000
Tr 250×40	40	20	250.000	230.000	210.000
Tr 250×22	22	11	250.000	239.000	228.000
Tr 250×12	12	6	250.000	244.000	238.000
Tr 260×40	40	20	260.000	240.000	220.000
Tr 260×22	22	11	260.000	249.000	238.000
Tr 260×12	12	6	260.000	254.000	248.000
Tr 270×40	40	20	270.000	250.000	230.000
Tr 270×24	24	12	270.000	258.000	246.000
Tr 270×12	12	6	270.000	264.000	258.000
Tr 280×40	40	20	280.000	260.000	240.000
Tr 280×24	24	12	280.000	268.000	256.000
Tr 280×12	12	6	280.000	274.000	268.000

Table 2. (Continued)

Unit: mm

Designation of screw thread ⁽³⁾	Pitch <i>P</i>	Height of engagement <i>H₁</i>	Internal thread		
			Major diameter <i>D</i>	Pitch diameter <i>D₂</i>	Minor diameter <i>D₁</i>
			External thread		
			Full diameter <i>d</i>	Pitch diameter <i>d₂</i>	Major diameter <i>d₁</i>
Tr 290×44	44	22	290.000	268.000	246.000
Tr 290×24	24	12	290.000	278.000	266.000
Tr 290×12	12	6	290.000	284.000	278.000
Tr 300×44	44	22	300.000	278.000	256.000
Tr 300×24	24	12	300.000	288.000	276.000
Tr 300×12	12	6	300.000	294.000	288.000

Note (3) The symbol Tr shall be the symbol indicating the metric trapezoidal screw threads.

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