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JAPANESE INDUSTRIAL STANDARD

Circular Saws with Cemented Carbide Tips

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

JAPANESE INDUSTRIAL STANDARD

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Circular Saws with Cemented Carbide Tips

B 4805-1989

1. Scope

This Japanese Industrial Standard specifies the circular saws with cemented carbide tips to be used mainly for wood workings.

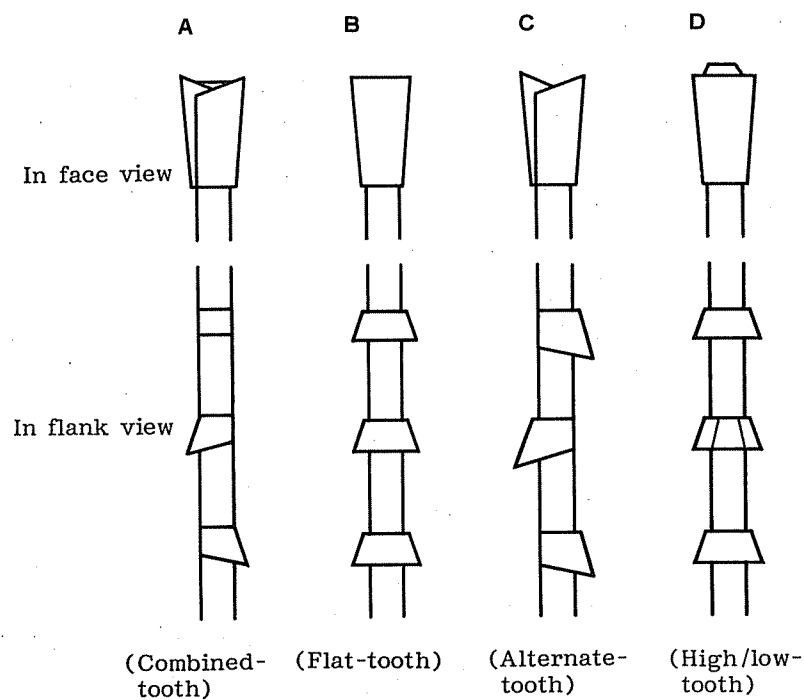
2. Definitions

For the purposes of this Standard, definitions in JIS B 0172 apply.

3. Types

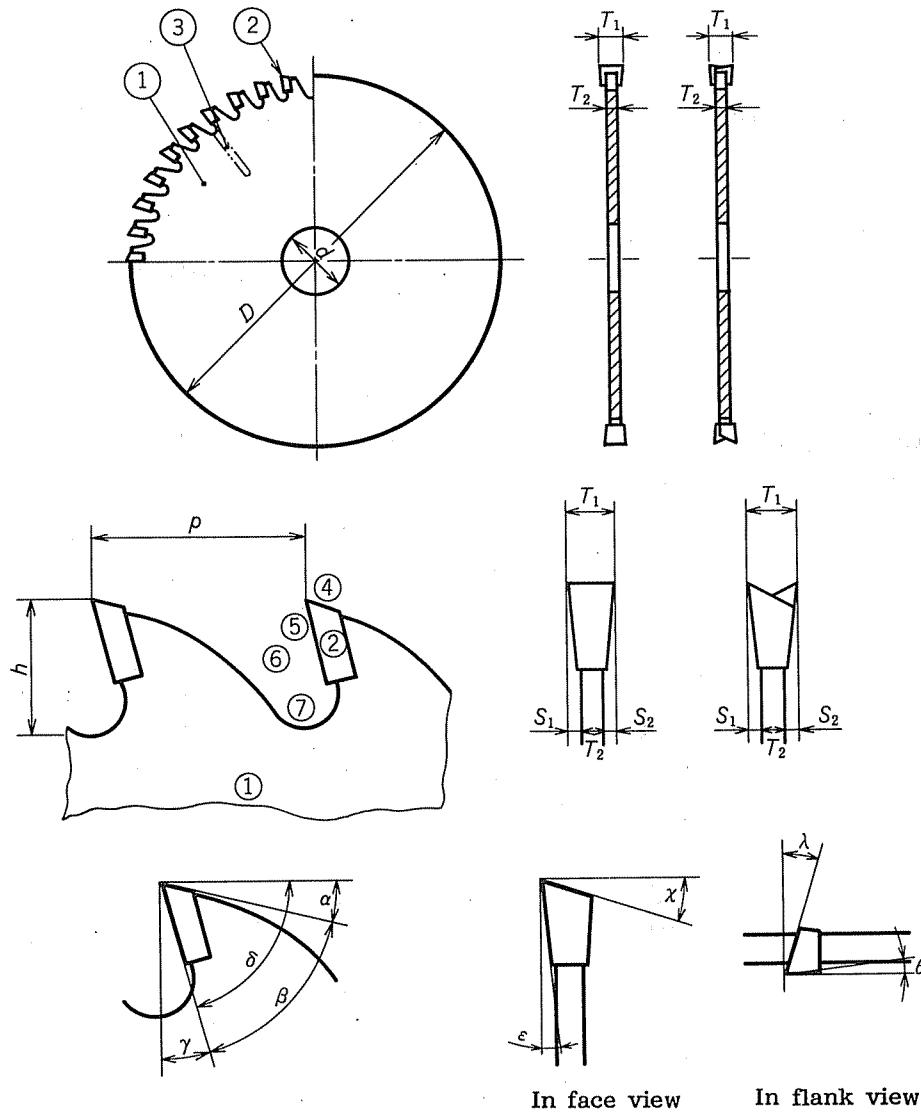
The types of the circular saws with cemented carbide tips shall be classified into 4 types of A, B, C and D of Fig. 1, and combination of these according to the tooth shapes.

Fig. 1. Tooth Shapes

4. Shapes, Nomenclatures and Dimensions

The shapes and nomenclatures of respective parts of the circular saws with cemented carbide tips shall be in accordance with Fig. 2, and the dimensions shall be in accordance with Table 1.

Fig. 2. Examples of Shapes and Nomenclatures of Respective Parts



No.	Nomenclature
1	Body
2	Tip
3	Slit *
4	Flank
5	Face
6	Gullet area
7	Bottom

Nomenclature	Symbol (Informative reference)	Nomenclature	Symbol (Informative reference)
Outside diameter	D	Clearance angle of tip	α
Bore diameter	d	Included angle	β
Pitch	p	Rake angle	γ
Tooth height	h	Cutting angle	δ
Tooth thickness	T_1	Cutting edge angle	χ
Thickness of body	T_2	Lateral face angle	λ
Set	S_1, S_2	Side angle to centre	ϵ
		Side clearance angle	θ

Note * There are circular saws with cemented carbide tips which are not provided with slot or these provided with plural number of slits.

Table 1. Dimensions

Unit: mm

Outside diameter D		Bore diameter d		Tooth thickness T_1		Thickness of body T_2		(Informative reference) Number of teeth (pieces)
Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance	
205	± 2	25.4	H 8	1.8	± 0.1	1.0	± 0.08	24, 32, 40
255				2.0		1.2		
305				2.4		1.4		
355				2.8		1.6		
				3.0		1.8		
				3.2		2.0		80, 96, 100
				3.5		2.2		120
						2.5		
405	± 2	30	H 8	3.0	± 0.1	2.0	± 0.08	32, 40
455				3.2		2.2		48, 60
510				3.5		2.5		72, 80
560				4.0		3.0		96, 100
610				4.5		3.2		120, 140
				5.0		3.5		
						4.0		

Remark: For the basic dimension of the bore diameter, other dimension may be determined as agreed between the parties concerned.

5. Qualities

5.1 Appearance The appearance of the circular saws with cemented carbide tips shall be in accordance with Table 2.

Table 2. Appearance

Appearance	Requirements
Tip	There shall be no harmful defects such as macrostreak-flaws, chippings and crackings.
Joint part	There shall be no harmful defects such as clearances and bubbles.
Finish of cutting edge	There shall be no harmful shear drops and edge chippings, and the surface roughness shall be 3.2 S.
Body	The surface shall be flat and smooth, free from such defects as crackings, fissures, burrs, harmful flaws, and rust, and the degree of finish shall be excellent.

5.2 Runout The permissible values for the runout of peripheral cutting edge and that of the side face of tip end of the circular saws with cemented carbide, when subjected to the test specified in 7.3, shall conform to Table 3.

5.3 Tensioning Condition Those circular saws with cemented carbide tips which have been processed with tensioning shall be uniform in tensioning effect on both faces, so that any harmful warp or strain which gives influence on the sawn materials shall not be produced.

Remark: Tensioning: For the purpose of preventing the saw body from generation of harmful deformation due to sawn materials, a treatment to give counter deformation to the saw body in advance.

Table 3. Runouts

Unit: mm

Outside diameter	Permissible value of runout on peripheral cutting edge (max.)	Permissible value of runout on side face of tip end (min.)
205	0.08	0.15
255		
305	0.10	0.20
355		
405	0.15	0.25
455		0.30
510	0.20	0.35
560		
610		

5.4 Cutting Quality The cutting quality of the circular saws with cemented carbide tips shall be excellent.

5.5 Hardness of Body The hardness of the body used for the circular saws with cemented carbide tips shall be HRC 35 or over.

6. Materials

The materials of the circular saws with cemented carbide tips shall be in accordance with Table 4.

Table 4. Materials

No.	Name of part	Material
1	Tip	K 10, K 20 and K 30 specified in JIS B 4104 or those having performance equal or superior to these.
2	Body	SK 5 of JIS G 4401 or steel having performance equal to or superior to this in use.

7. Test Methods

7.1 Shapes and Dimensions The tests on the shape and dimensions of the circular saws with cemented carbide tips shall be in accordance with Table 5.

Table 5. Tests on Shape and Dimensions

Item	Test method
Outside diameter	Measure the outside diameter by using the vernier calipers specified in JIS B 7507 or the metal rule of grade 2 specified in JIS B 7516.
Bore diameter	Measure the bore diameter by the inside micrometer specified in JIS B 7420 or a plug gauge which has applied the limit gauge tolerance IT 8, as appropriate, specified in JIS B 7421.
Edge thickness	Measure the edge thickness by the micrometer specified in JIS B 7502, the vernier calipers specified in JIS B 7507 or a measuring instrument equal or superior to these.
Thickness of body	Measure the thickness of body by the micrometer callipers for external measurement specified in JIS B 7502.

7.2 Appearance The appearance of the circular saws with cemented carbide tips shall be examined by the visual inspection, and the surface roughness of the cutting parts shall be measured by comparing with the roughness comparison specimens specified in JIS B 0659.

7.3 Runouts

7.3.1 General The runouts of the circular saws with cemented carbide tips shall be measured as follows:
Interpose a circular saw with cemented carbide tip between the flanges of the same diameter from both sides on a flanged test arbor, as given in Fig. 3, and fasten securely with a nut. The outside diameter of the flanges used shall conform to Table 6.

In addition, the dial gauge used in the measurement shall be used with attaching the flat seat type contacting point, as required, to the dial gauge specified in JIS B 7503.

Fig. 3. Measurements of Runouts for Peripheral Cutting Edges and Side Face of Tip End

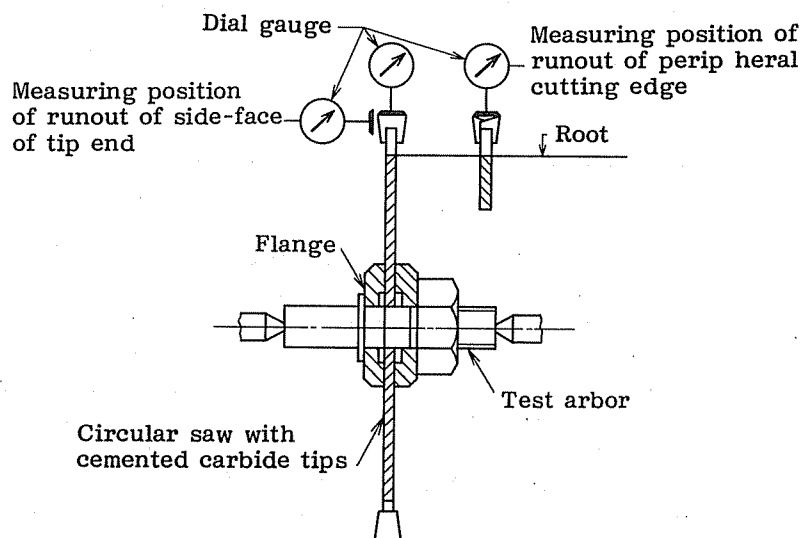


Table 6. Flange Diameters

Unit: mm	
Outside diameter of circular saw with cemented carbide tips	Flange diameter
205	80
255 305	100
355 405 455	120
510 560 610	160

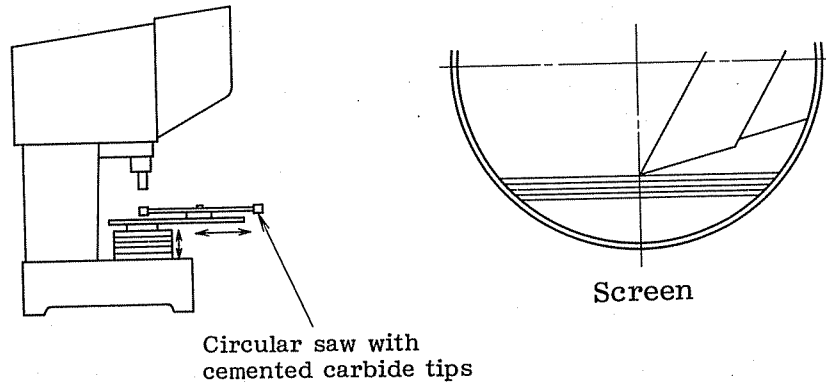
7.3.2 Runout of Peripheral Cutting Edge The runout of the peripheral cutting edge of the circular saw with cemented carbide tips shall be measured as follows:

Apply a dial gauge to the peripheral cutting edge from vertical direction to the test arbor, read out the values of dial gauge while gently turning the circular saw with cemented carbide tips, and consider the difference between the maximum value and the minimum value to be the runout of the peripheral cutting edge.

The following method may be applied, otherwise.

Place a circular saw with cemented carbide tips on the measuring jig of a universal projector, rotate the tip end part while magnifying to 50 times or over, and consider the difference between the maximum value and the minimum value of the readings on the screen to be the runout of the peripheral cutting edge.

Fig. 4. Measurement of Runout of Peripheral Cutting Edge by Universal Projector



7.3.3 Runout of Side Face of Tip End The runout of the side face of the tip end of the circular saw with cemented carbide tips shall be measured as follows: Apply a dial gauge to tooth end part from parallel direction to the test arbor, rotate the circular saw quietly, take readings of values thereof, and consider the difference between the maximum value and the minimum value to be the measured value. Carry out this procedure on both sides.

7.4 Hardness of Body The hardness of the body shall be measured in accordance with the test method of JIS Z 2245 by using the testing machine specified in JIS B 7726.

8. Inspection

The inspection of the circular saws with cemented carbide tips shall be carried out on the shape and dimensions, appearance, runouts, tensioning condition, cutting quality and hardness, and the results shall conform to 4. and 5.

9. Package

The circular saws with cemented carbide tips shall be properly packaged for the purposes of protection against rust, and impact, safety and others.

10. Designation of Products

The circular saws with cemented carbide tips shall be designated by the number of Standard or title of Standard, outside diameter, tooth thickness, thickness of body, bore diameter, number of teeth and tooth shape.

Remark: The designation of the combined tooth shape shall be as agreed between the parties concerned.

Example:	JIS B 4805	205 x 1.8 x 1.0 x 25.4 x 60 x A
	Circular saws with cemented carbide tips	305 x 3.0 x 2.0 x 30 x 80 x B

11. Marking

11.1 Marking of Products The circular saws with cemented carbide tips shall be marked with the following information on the surface of the products.

- (1) Dimensions Outside diameter x tooth thickness x thickness of body
x bore diameter ($D \times T_1 \times T_2 \times d$)
- (2) Number of teeth
- (3) Tooth shape
- (4) Manufacturer's name or its abbreviation

11.2 Marking of Package The package shall be marked with the information specified in 11.1.

However, a part of these may be omitted as agreed between the parties concerned.

Applicable Standards:

- JIS B 0172-Glossary of Terms for Milling cutters
- JIS B 0659-Roughness Comparison Specimens
- JIS B 4104-Cemented Carbide Tips
- JIS B 7420-Limit Gauges
- JIS B 7421-Tolerances, Allowable Deviations and Permissible Wears
of Limit Gauges
- JIS B 7502-Micrometer Callipers for External Measurement
- JIS B 7503-Dial Gauges Reading in 0.01 mm
- JIS B 7507-Vernier Callipers
- JIS B 7516-Metal Rules
- JIS B 7726-Rockwell and Rockwell Superficial Hardness Testing
Machines
- JIS G 4401-Carbon Tool Steels
- JIS Z 2245 Method of Rockwell and Rockwell Superficial Hardness Test

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