

JIS

JAPANESE INDUSTRIAL STANDARD

Indexable Inserts with
Cylindrical Fixing Hole,
with 0° Normal Clearance

JIS B 4123—1985

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J I S

Indexable Inserts with Cylindrical Fixing Hole,
with 0° Normal Clearance

B 4123-1985

1. Scope

This Japanese Industrial Standard specifies the indexable cemented carbide inserts with fixing holes and 0° normal clearance angle to be used for indexable insert holders and the like, hereinafter referred to as the "inserts".

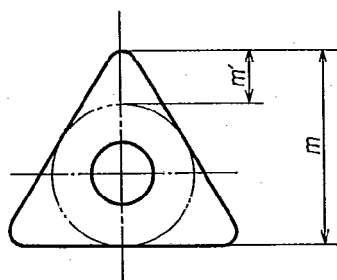
Remark: It is preferable to apply this standard, with due changes having been made, for indexable inserts made of cermet and ceramics.

2. Definitions

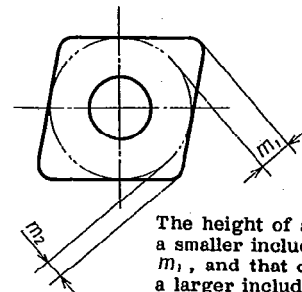
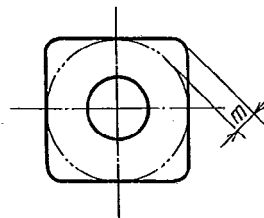
For the purposes of this standard, the following definitions apply:

- (1) basic inscribed circle (d) An inscribed circle used as the basis to define the height of corners and the size of inserts, and having the diameter equal to the basic size.
- (2) height of corner (m) The maximum distance from the basic inscribed circle to a corner which specifies the relative position of the corner and the basic inscribed circle.

Example:



In this case, dimension m in place of m is designated as the height of corner.



The height of a corner with a smaller included angle shall be m_1 , and that of a corner with a larger included angle shall be m_2 .

- (3) bias in hole position The bias of the shortest distance from the inside wall of the hole for clamping to the side face. This is expressed as the difference of the maximum value and the minimum value of the distance from each side face to the inside wall of the hole.

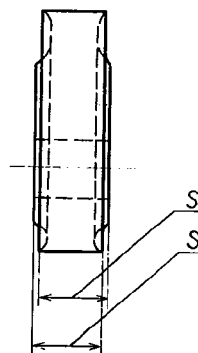
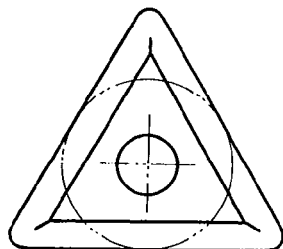
Applicable Standards and

Corresponding International Standard: See page 28.

2
B 4123-1985

- (4) thickness of insert (s) The height from the bottom face to the cutting edge.

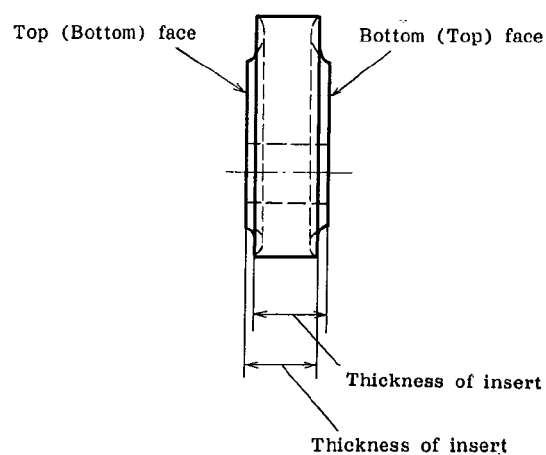
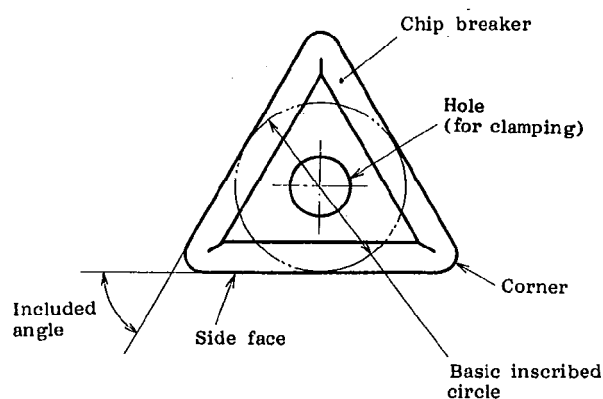
Example:



3. Name of Each Part

The name of each part of inserts shall be in accordance with Fig. 1.

Fig. 1. Triangular Negative Insert with Fixing Hole



4. Type and Tolerance Class

The type of insert shall be classified according to the shape and the existence of chip breakers, and the tolerance class shall be classified according to the dimensional precision. These shall be as given in Table 1.

Table 1. Type and Tolerance Class

Shape	Tolerance class	With or without chip breaker	Symbol	Number of attached table
Triangular	Grade G	Top and bottom faces	TNGG	Attached Table 1
		Without	TNGA	Attached Table 2
	Grade M	Top and bottom faces	TNMG	Attached Table 3
		One face	TNMM	Attached Table 4
		Without	TNMA	Attached Table 5
Square	Grade G	Top and bottom faces	SNGG	Attached Table 6
		Without	SNGA	Attached Table 7
	Grade M	Top and bottom faces	SNMG	Attached Table 8
		One face	SNMM	Attached Table 9
		Without	SNMA	Attached Table 10
Rhombic (Included angle 80°)	Grade G	Top and bottom faces	CNGG	Attached Table 11
		Without	CNGA	Attached Table 12
	Grade M	Top and bottom faces	CNMG	Attached Table 13
		One face	CNMM	Attached Table 14
		Without	CNMA	Attached Table 15
Rhombic (Included angle 55°)	Grade G	Top and bottom faces	DNGG	Attached Table 16
		Without	DNGA	Attached Table 17
	Grade M	Top and bottom faces	DNMG	Attached Table 18
		One face	DNMM	Attached Table 19
		Without	DNMA	Attached Table 20

5. Group of Application and Symbol

Groups of application of inserts and their symbols shall be in accordance with JIS B 4053.

6. Shape and Size

The shape and size shall be in accordance with Attached Tables 1 to 20. The dimensional tolerances corresponding to tolerance classes shall be in accordance with Table 2. The shape of chip breakers and of top and bottom faces are not specified in this standard.

Table 2. Dimensional Tolerance

Unit: mm

Diameter of basic inscribed circle Tolerance class	Dimension (d) of inscribed circle		Height of corner (m, m_1, m_2)		Thick-ness of insert	Hole diameter	Corner radius	Bias of hole position	Included angle	
	G	M	G	M ⁽¹⁾	(s)	(d_1)	(r_c)		G	M
6.35	±0.025	±0.05	±0.025	±0.08	Common to each tolerance class	Common to each tolerance class	Common to each tolerance class	Common to each tolerance class	±15'	±30'
9.525										
12.70		±0.08		±0.13						
15.875		±0.10		±0.15						
19.05										
25.40	—	±0.13	—	±0.18						

Note (1) The dimensional tolerance for the 55° rhombic inserts shall be as follows:

In the case of the basic inscribed circle diameter of 12.70 mm, ± 0.15 mm.

7. Quality

7.1 Appearance The appearance of inserts shall be free from cracks, flaws harmful in use, distortions and other defects. Further, the top and bottom faces and the side faces of inserts shall be free from extraneous materials and convexity which would adversely affect the clamping of inserts.

7.2 Surface Roughness The surface roughness of inserts shall be in accordance with Table 3.

Table 3. Surface Roughness

Part of insert	Surface roughness
The top and bottom faces and the side faces, ground	0.2 a (about 0.8 S)
Sintered surface	0.8 a (about 3.2 S)

7.3 Hardness and Transverse Strength The hardness and the transverse strength shall be in accordance 5.2 of JIS B 4104.

8. Material

The material of inserts shall be in accordance with 6. of JIS B 4104.

9. Test Method

9.1 Shape and Size The shape and size of inserts shall be measured in accordance with Table 4.

Table 4. Shape and Size

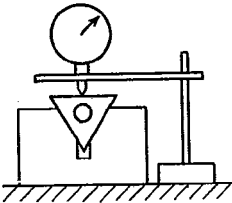
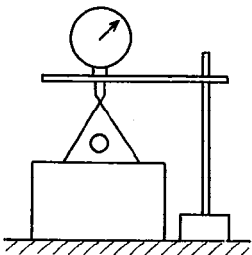
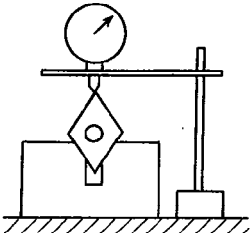
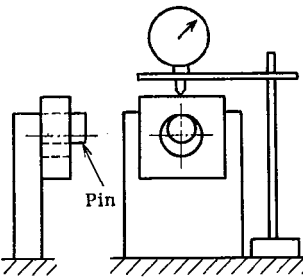
No.	Item	Symbol in attached table	Measuring method	Figure of measuring method	Measuring instrument
1	Inscribed circle	d	(1) In the case of triangular insert: Mount the insert on a 60 deg V-block, take the reading on a dial gauge of which the plunger is in contact with the horizontal plane of the insert, and also take the reading on the dial gauge, in the same way, by mounting the reference gauge⁽²⁾ on the V-block. Multiply the difference between both readings by 2/3. This value gives a direct error of the diameter d to be checked. In another way, measure the diameter d by means of a micrometer calliper with three contact points. (2) In the case of square and rhombic inserts: Measure the distance between the opposite sides of the insert by means of a micrometer calliper. In another way, take the readings on a dial gauge for the above distance of the insert and for the diameter d of the reference gauge⁽²⁾. The difference between both readings gives a direct error of the diameter d to be checked.		Micrometer callipers for external measurement specified in JIS B 7502. Dial gauges specified in JIS B 7503 or JIS B 7509.

Table 4 (Cont'd)

No.	Item	Symbol in attached table	Measuring method	Figure of measuring method	Measuring instrument
2	Height of corner	m m_1 m_2	(1) In the case of triangular insert: Measure the perpendicular distance from the top of the corner to the opposite side with a micrometer calliper or a dial gauge.		Micrometer callipers for external measurement specified in JIS B 7502. Dial gauges specified in JIS B 7503 or JIS B 7509.
			(2) In the case of square and rhombic inserts: Mount the insert on a V-block with the V-angle equal to the included angle of the insert, take the reading on a dial gauge of which the plunger is in contact with the corner part, and also take the reading, in the same way, by mounting the reference gauge ⁽²⁾ of diameter d on the V-block. Obtain the difference between both readings.		Dial gauges specified in JIS B 7503 or JIS B 7509.
3	Thickness of insert	s	Measure the height from the bottom face to the cutting edge with a micrometer calliper or a dial gauge.		Micrometer callipers for external measurement specified in JIS B 7502, or dial gauges specified in JIS B 7503 and block gauges specified in JIS B 7506.
4	Hole diameter	d_1	Check d_1 with go and not-go gauges equal to the maximum and minimum values of the hole diameter.		
5	Bias of hole position		Put a hole of the insert on a pin which is fixed perpendicularly to a block standing vertically to the base plate and has a diameter slightly smaller than that of the hole, measure the distance between each side face of the insert and the top of the pin by means of a dial gauge. In another way, measure the distance between each side face and inside wall of the hole of the insert directly by means of a micrometer calliper for measuring wall thickness, and obtain the difference between the maximum and minimum values.		Dial gauges reading in 0.01 mm specified in JIS B 7503.
6	Included angle and corner radius	r_c	Magnify the included angle part with a projector and measure degrees of the included angle and the corner radius.		Projector (about 10 magnification)

Note ⁽²⁾ The reference gauge stands for the cylindrical gauge having the outside diameter equal to the diameter of the basic inscribed circle of the insert.

Remark: The measuring methods and measuring instruments are shown as general examples.

9.2 Appearance The appearance of inserts shall be observed visually or by means of a magnifier.

9.3 Surface Roughness The surface roughness of inserts shall be measured visually by using the roughness comparison specimens specified in JIS B 0659 or limit samples corresponding to these specimens.

9.4 Hardness and Transverse Strength The hardness and the transverse strength of inserts shall be measured in accordance with 7. of JIS B 4104.

10. Inspection

The insert shall be inspected for shape, size, appearance, surface roughness, hardness and transverse strength, and shall comply with requirements specified in 6. and 7.

11. Designation of Products

The designation of the insert shall be in accordance with the number of this standard or its title, symbol of designation ⁽³⁾, symbol for groups of application ⁽⁴⁾ and material class symbol ⁽⁵⁾.

Example: JIS B 4123 SNGA 432 P 10 material class symbol
JIS B 4123 SNGA 120408 P 10 material class symbol
Indexable insert SNGA 432 P 10 material class symbol
Indexable insert SNGA 120408 P 10 material class symbol

Note ⁽³⁾ The symbol of designation shall be in accordance with JIS B 4120.

⁽⁴⁾ This means the symbol for groups of application specified in JIS B 4053. For materials which are not specified in the standard, this symbol may be omitted.

⁽⁵⁾ This material class symbol is specified by each manufacturer of inserts.

12. Marking

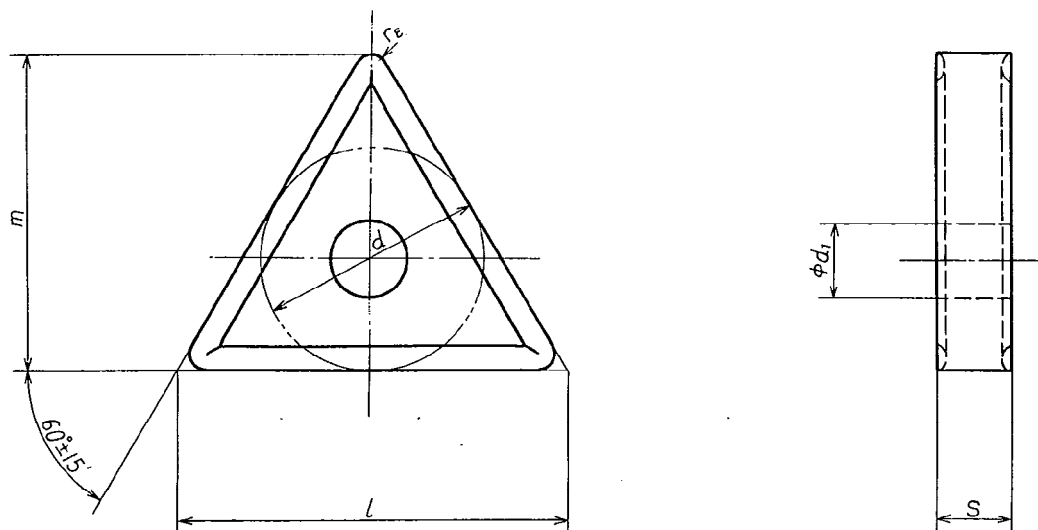
12.1 Marking on Product Each insert shall be marked with the symbol for groups of application or the material class symbol.

12.2 Marking on Package The following information shall be marked clearly on each package.

- (1) Symbol of designation ⁽³⁾
- (2) Symbol for groups of application ⁽⁴⁾
- (3) Material class symbol ⁽⁵⁾
- (4) Manufacturer's name or its abbreviation

Attached Table 1

(The figure shows the case where the height from the top to the bottom faces and the height of cutting edge are the same.)



Unit: mm

Symbol of designation		<i>l</i> (about)	<i>d</i>		<i>s</i>		<i>m</i>		<i>d_i</i>		<i>r_c</i>	
Inch system	Metric system		Basic size	Tolerance	Basic size	Tolerance	Basic size	Tolerance	Basic size	Tolerance	Basic size	Tolerance
TNGG 22Y	TNGG 110302	11.0	6.35		3.18		9.322		2.26		0.2	±0.10
TNGG 221	TNGG 110304						9.128				0.4	
TNGG 222	TNGG 110308						8.731				0.8	
TNGG 321	TNGG 160304	16.5	9.525	±0.025	4.76	±0.13	13.891	±0.025	3.81	±0.08	0.4	
TNGG 322	TNGG 160308						13.494				0.8	
TNGG 331	TNGG 160404						13.891				0.4	
TNGG 332	TNGG 160408						13.494				0.8	
TNGG 333	TNGG 160412						13.097				1.2	
TNGG 334	TNGG 160416						12.700				1.6	
TNGG 431	TNGG 220404	22.0	12.70				18.653		5.16		0.4	
TNGG 432	TNGG 220408						18.256				0.8	
TNGG 433	TNGG 220412						17.859				1.2	
TNGG 434	TNGG 220416						17.463				1.6	