

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 883

THROWAWAY CARBIDE INDEXABLE INSERTS

DIMENSIONS

1st EDITION

September 1969

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BRIEF HISTORY

The ISO Recommendation R 883, *Throwaway carbide indexable inserts – Dimensions*, was drawn up by Technical Committee ISO/TC 29, *Small tools*, the Secretariat of which is held by the Association Française de Normalisation (AFNOR).

Work on this question led to the adoption of a Draft ISO Recommendation.

In December 1966, this Draft ISO Recommendation (No. 997) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	Hungary	Poland
Austria	India	Portugal
Belgium	Israel	Spain
Brazil	Italy	Sweden
Chile	Korea, Rep. of	Switzerland
Czechoslovakia	Netherlands	Turkey
France	New Zealand	U.A.R.
Germany	Norway	United Kingdom

Two Member Bodies opposed the approval of the Draft :

U.S.A.
U.S.S.R.

Subsequently, Technical Committee ISO/TC 29 revised the text of Draft ISO Recommendation No. 997 with a view to aligning it with the new method of designation of inserts, which will be the subject of a separate ISO Recommendation.

This revised Draft ISO Recommendation (No. 997/B) was then submitted by correspondence, and in conformity with the abbreviated procedure, direct to the ISO Council, which decided, in September 1969, to accept it as an ISO RECOMMENDATION.

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THROWAWAY CARBIDE INDEXABLE INSERTS

DIMENSIONS

1. SCOPE

This ISO Recommendation relates to carbide inserts and deals only with throwaway inserts, i.e. inserts intended to be mounted mechanically, and not by brazing, on the shanks of tools.

It should be considered as the logical continuation of ISO Recommendation R 242 which, under the general title *Carbide tips for turning tools*, deals only with inserts intended to be fixed on the shanks of tools by brazing.

The four types of throwaway inserts are as follows :

TN : triangular, without side-clearance

TP : triangular, with side-clearance

SN : square, without side-clearance

SP : square, with side-clearance



Owing to the fact that they have no proper side-clearance, the TN and SN inserts, intended for tools with negative top rake angle, are reversible; the cutting edge of either face may be used indifferently.

The TP and SP inserts, intended for tools with positive top rake angle, can, on the other hand, be effective only through the cutting edges of their greater face and they are not reversible.

As regards precision, throwaway inserts are machined in one of the two following classes of tolerances :

Class U : "utility ground" (an insert whose upper and lower faces are ground whereas the sides remain as sintered);

Class G : "precision ground" (an insert which is ground all over).

2. INTERCHANGEABILITY

2.1 Inches-millimetres interchangeability

This ISO Recommendation includes two series of tables, one in millimetres, the other in inches; the values given ensure strict interchangeability, whichever system of units is used.

As regards the verification of dimension m , this interchangeability has been obtained by direct conversion into millimetres of the nominal value in inches, calculated from the nominal values, in inches, of the radius r , the diameter d or the length l .

2.2 Interchangeability with "ceramic" inserts

Pending the preparation of an ISO Recommendation concerning "ceramic" throwaway inserts, it is recommended, with a view to interchangeability, that these inserts be given the same nominal dimensions l and the same radii r as for the carbide inserts of this ISO Recommendation.

3. DESIGNATION AND MARKING

The designation for the throwaway carbide indexable inserts covered by this ISO Recommendation conforms to ISO Recommendation R . . .*, *Throwaway carbide indexable inserts – Designation – Code of symbolization*.

3.1 Designation

The designation of a throwaway indexable insert always consists of seven symbols of designation :

- letter symbol for identifying insert shape;
- letter symbol for identifying side-clearance;
- letter symbol for indicating tolerance;
- letter symbol for indicating conditions on top rake surfaces and/or for fixing;
- number symbol for identifying insert size;
- number symbol for identifying insert thickness;
- number symbol for identifying cutting point configuration (the size of the corner radius).

In addition to these symbols, indication should be given of

- either the symbol of the group of application, as shown in ISO Recommendation R 513, *Application of carbides for machining by chip removal – Designation of main groups of chip removal and groups of application*,
- or the commercial designation of carbide grade,
- or both.

3.2 Marking

The following symbols at least should be marked on the insert itself (except when this would be difficult on the smaller inserts) :

- number symbol for identifying cutting point configuration (the size of the corner radius);
- symbol of the group of application or commercial designation of the carbide grade (or even both, if possible, on large inserts).

* At present, Draft ISO Recommendation No. 1832.

4. RECOMMENDED DIMENSIONS FOR THE METRIC SERIES

4.1 Triangular inserts without side-clearance (symbol TN) for tools with negative top rake angle

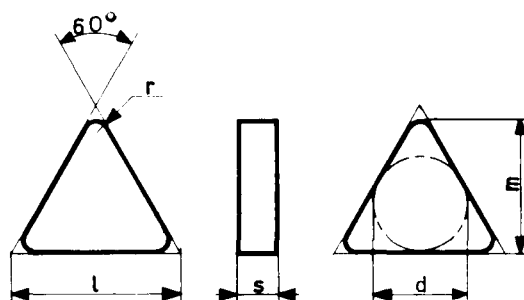


TABLE 1 – Class U (Utility ground)

Dimensions in millimetres							
Designation	l nominal	s ± 0.13	r ± 0.10	d nominal	Tolerances	m^* nominal	Tolerances
TNUN 11 03 04	11.0	3.18	0.4	6.35	± 0.13	9.128	± 0.29
TNUN 11 03 08			0.8			8.731	
TNUN 16 04 08	16.5	4.76	0.8	9.52		13.494	
TNUN 16 04 12			1.2			13.097	
TNUN 22 04 12	22.0	4.76	1.2	12.70	± 0.18	17.859	± 0.37
TNUN 22 04 16			1.6			17.463	

* For the measurement of dimension m see Annex A.

TABLE 2 – Class G (Precision ground)

Designation	Dimensions in millimetres				
	l nominal	s ± 0.13	r ± 0.10	d nominal	m^* ± 0.025
TNGN 11 03 04	11.0	3.18	0.4	6.35	9.128
TNGN 16 04 08	16.5	4.76	0.8	9.52	13.494
TNGN 16 04 12			1.2		13.097
TNGN 22 04 12	22.0	4.76	1.2	12.70	17.859

* For the measurement of dimension m see Annex A.

4.2 Triangular inserts with side-clearance (symbol TP) for tools with positive top rake angle

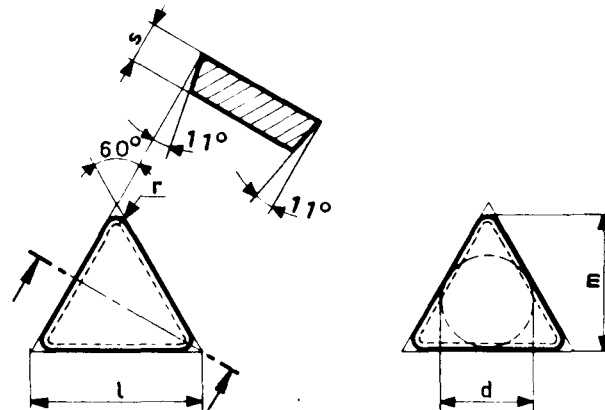


TABLE 3 – Class U (Utility ground)

Dimensions in millimetres

Designation	l nominal	s ± 0.13	r ± 0.10	d nominal Tolerances	m^* nominal Tolerances
TPUN 16 03 08	16.5	3.18	0.8	9.52 ± 0.13	13.494
TPUN 16 03 12			1.2		13.097
TPUN 22 04 12	22.0	4.76	1.2	12.70 ± 0.18	17.859
TPUN 22 04 16			1.6		17.463

* For the measurement of dimension m see Annex A.

TABLE 4 – Class G (Precision ground)

Dimensions in millimetres

Designation	l nominal	s ± 0.13	r ± 0.10	d nominal	m^* ± 0.025
TPGN 16 03 08	16.5	3.18	0.8	9.52	13.494
TPGN 16 03 12			1.2		13.097
TPGN 22 04 12	22.0	4.76	1.2	12.70	17.859

* For the measurement of dimension m see Annex A.

4.3 Square inserts without side-clearance (symbol SN) for tools with negative top rake angle

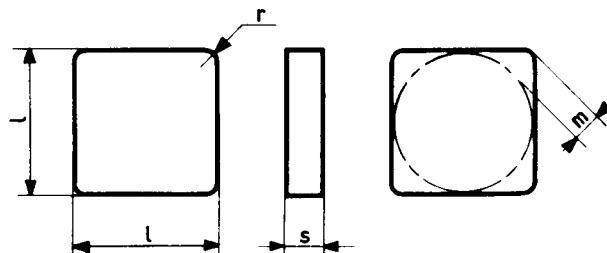


TABLE 5 – Class U (Utility ground)

Dimensions in millimetres						
Designation	nominal	l Tolerances	s ± 0.13	r ± 0.10	nominal	m^* Tolerances
SNUN 09 03 04	9.52	± 0.13	3.18	0.4	1.808	± 0.22
SNUN 09 03 08				0.8	1.644	
SNUN 12 04 08	12.70		4.76	0.8	2.301	
SNUN 12 04 12				1.2	2.137	
SNUN 15 04 12	15.88	± 0.18	4.76	1.2	2.795	± 0.29
SNUN 15 04 16				1.6	2.630	
SNUN 19 04 12	19.05		4.76	1.2	3.452	
SNUN 19 04 16				1.6	3.288	

* For the measurement of dimension m see Annex A.

TABLE 6 – Class G (Precision ground)

Designation	Dimensions in millimetres			
	l nominal	s ± 0.13	r ± 0.10	m^* ± 0.025
SNGN 09 03 08	9.52	3.18	0.8	1.644
SNGN 12 04 08	12.70	4.76	0.8	2.301
SNGN 12 04 12			1.2	2.137

* For the measurement of dimension m see Annex A.

4.4 Square inserts with side-clearance (symbol SP) for tools with positive top rake angle

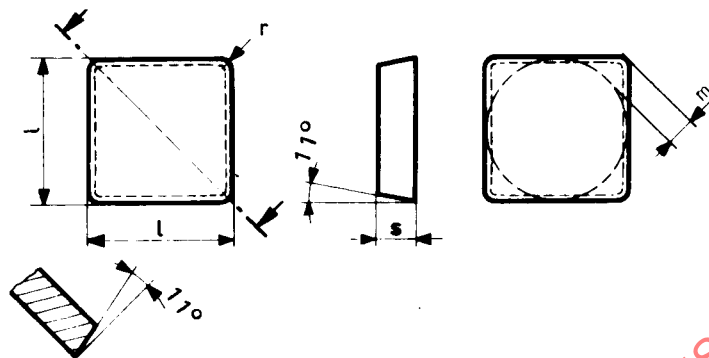


TABLE 7 – Class U (Utility ground)

Dimensions in millimetres

Designation	l		s	r	m^*	
	nominal	Tolerances			nominal	Tolerances
SPUN 12 03 08	12.70	± 0.13	3.18	0.8	2.301	± 0.22
SPUN 12 03 12				1.2	2.137	
SPUN 19 04 16	19.05	± 0.18	4.76	1.6	3.288	± 0.29

- For the measurement of dimension m see Annex A.

TABLE 8 – Class G (Precision ground)

Dimensions in millimetres

Designation	l		s	r	m^*
	nominal	Tolerances			
SPGN 12 03 08	12.70	3.18	0.8	2.301	± 0.025
SPGN 12 03 12					

- For the measurement of dimension m see Annex A.

5. RECOMMENDED DIMENSIONS FOR THE INCH SERIES

5.1 Triangular inserts without side-clearance (symbol TN) for tools with negative top rake angle

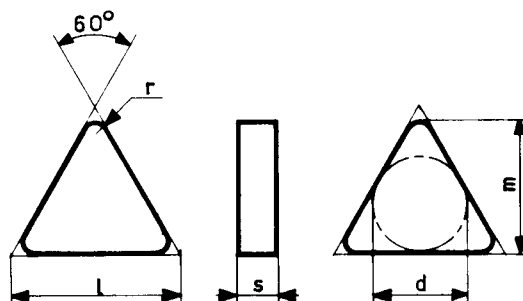


TABLE 9 – Class U (Utility ground)

Dimensions in inches

Designation	l	s	r	d		m^*	
	nominal	± 0.005	± 0.004	nominal	Tolerances	nominal	Tolerances
TNUN 2 2 1	0.43	0.1250	0.0156	0.250	± 0.005	0.3594	± 0.0115
TNUN 2 2 2			0.0313			0.3438	
TNUN 3 3 2	0.65	0.1875	0.0313	0.375		0.5313	
TNUN 3 3 3			0.0469			0.5156	
TNUN 4 3 3	0.87	0.1875	0.0469	0.500	± 0.007	0.7031	± 0.0145
TNUN 4 3 4			0.0625			0.6875	

* For the measurement of dimension m see Annex A.

TABLE 10 – Class G (Precision ground)

Dimensions in inches

Designation	l nominal	s ± 0.005	r ± 0.004	d nominal	m^* ± 0.001
TNGN 2 2 1	0.43	0.1250	0.0156	0.250	0.3594
TNGN 3 3 2	0.65	0.1875	0.0313	0.375	0.5313
TNGN 3 3 3			0.0469		0.5156
TNGN 4 3 3	0.87	0.1875	0.0469	0.500	0.7031

* For the measurement of dimension m see Annex A.

5.2 Triangular inserts with side-clearance (symbol TP) for tools with positive top rake angle

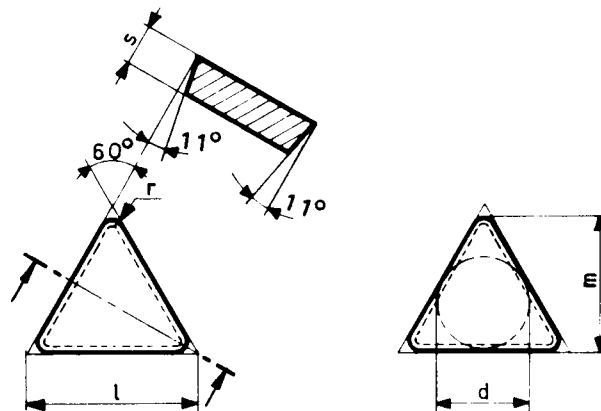


TABLE 11 – Class U (Utility ground)

Dimensions in inches

Designation	l nominal	s ± 0.005	r ± 0.004	d nominal	Tolerances	m^* nominal	Tolerances
TPUN 3 2 2	0.65	0.1250	0.0313	0.375	± 0.005	0.5313	± 0.0115
TPUN 3 2 3			0.0469			0.5156	
TPUN 4 3 3	0.87	0.1875	0.0469	0.500	± 0.007	0.7031	± 0.0145
TPUN 4 3 4			0.0625			0.6875	

- For the measurement of dimension m see Annex A.

TABLE 12 – Class G (Precision ground)

Dimensions in inches

Designation	l nominal	s ± 0.005	r ± 0.004	d nominal	m^* ± 0.001
TPGN 3 2 2	0.65	0.1250	0.0313	0.375	0.5313
TPGN 3 2 3			0.0469		0.5156
TPGN 4 3 3	0.87	0.1875	0.0469	0.500	0.7031

- For the measurement of dimension m see Annex A.

5.3 Square inserts without side-clearance (symbol SN) for tools with negative top rake angle

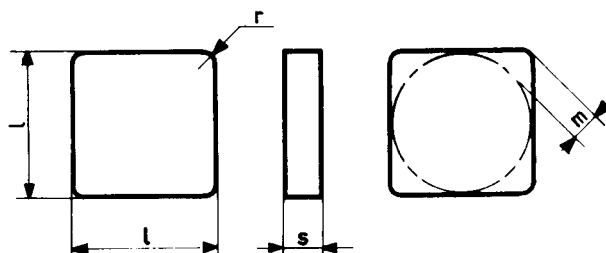


TABLE 13 – Class U (Utility ground)

Dimensions in inches

Designation	<i>l</i>		<i>s</i>		<i>r</i>		<i>m</i> **	
	nominal	Tolerances	± 0.005	± 0.004	nominal	Tolerances		
SNUN 3 2 1	0.375	± 0.005	0.1250	0.0156	0.0712	± 0.0087		
SNUN 3 2 2				0.0313	0.0647			
SNUN 4 3 2	0.500		0.1875	0.0313	0.0906			
SNUN 4 3 3				0.0469	0.0841			
SNUN 5 3 3	0.625	± 0.007	0.1875	0.0469	0.1100	± 0.0116		
SNUN 5 3 4				0.0625	0.1036			
SNUN 6 3 3	0.750		0.1875	0.0469	0.1359			
SNUN 6 3 4				0.0625	0.1294			

* For the measurement of dimension m see Annex A.

TABLE 14 – Class G (Precision ground)

Designation	Dimensions in inches			
	l nominal	s ± 0.005	r ± 0.004	m^* ± 0.001
SNGN 3 2 2	0.375	0.1250	0.0313	0.0647
SNGN 4 3 2	0.500	0.1875	0.0313	0.0906
SNGN 4 3 3			0.0469	0.0841

* For the measurement of dimension m see Annex A.

5.4 Square inserts with side-clearance (symbol SP) for tools with positive top rake angle

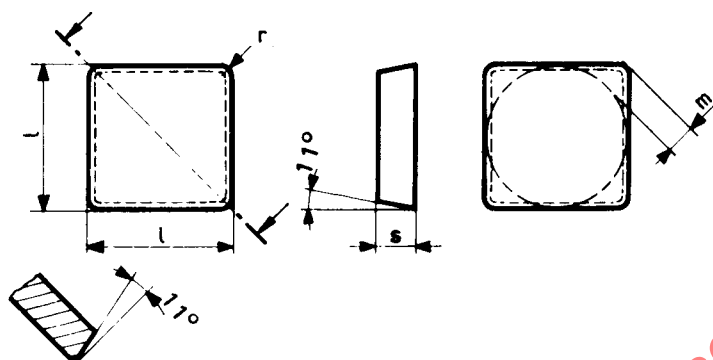


TABLE 15 – Class U (Utility ground)

Designation	Dimensions in inches					
	nominal	l Tolerances	s ± 0.005	r ± 0.004	nominal	m^* Tolerances
SPUN 4 2 2	0.500	± 0.005	0.1250	0.0313	0.0906	± 0.0087
SPUN 4 2 3				0.0469	0.0841	
SPUN 6 3 4	0.750	± 0.007	0.1875	0.0625	0.1294	± 0.0116

- For the measurement of dimension m see Annex A.

TABLE 16 – Class G (Precision ground)

Designation	Dimensions in inches			
	l nominal	s ± 0.005	r ± 0.004	m^* ± 0.001
SPGN 4 2 2	0.500	0.1250	0.0313	0.0906
SPGN 4 2 3			0.0469	0.0841

- For the measurement of dimension m see Annex A.