

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 883

THROWAWAY CARBIDE INDEXABLE INSERTS

DIMENSIONS

1st EDITION

September 1969

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Printed in Switzerland

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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

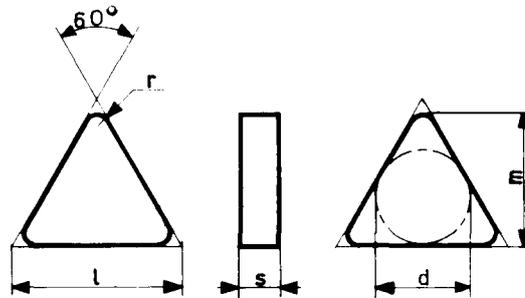


TABLE 1 - Class U (Utility ground)

| Designation | <i>l</i> nominal | <i>s</i> ± 0.13 | <i>r</i> ± 0.10 | <i>d</i> | | <i>m</i> * | |
|---------------|---------------------|--------------------|--------------------|----------|------------|------------|------------|
| | | | | nominal | Tolerances | 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 | <i>l</i> nominal | <i>s</i> ± 0.13 | <i>r</i> ± 0.10 | <i>d</i> | | <i>m</i> * | |
|---------------|---------------------|--------------------|--------------------|----------|------------|------------|------------|
| | | | | nominal | Tolerances | nominal | Tolerances |
| TNGN 11 03 04 | 11.0 | 3.18 | 0.4 | 6.35 | ± 0.025 | 9.128 | |
| TNGN 16 04 08 | 16.5 | 4.76 | 0.8 | 9.52 | ± 0.025 | 13.494 | |
| TNGN 16 04 12 | | | 1.2 | | | 13.097 | |
| TNGN 22 04 12 | 22.0 | 4.76 | 1.2 | 12.70 | ± 0.025 | 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

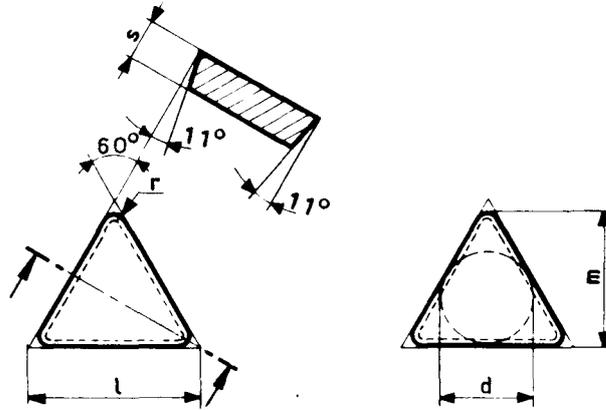


TABLE 3 - Class U (Utility ground)

Dimensions in millimetres

| Designation | l nominal | s ± 0.13 | r ± 0.10 | d | | m* | |
|---------------|--------------|-------------|-------------|---------|------------|---------|------------|
| | | | | nominal | Tolerances | nominal | Tolerances |
| TPUN 16 03 08 | 16.5 | 3.18 | 0.8 | 9.52 | ± 0.13 | 13.494 | ± 0.29 |
| TPUN 16 03 12 | | | 1.2 | | | 13.097 | |
| TPUN 22 04 12 | 22.0 | 4.76 | 1.2 | 12.70 | ± 0.18 | 17.859 | ± 0.37 |
| 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

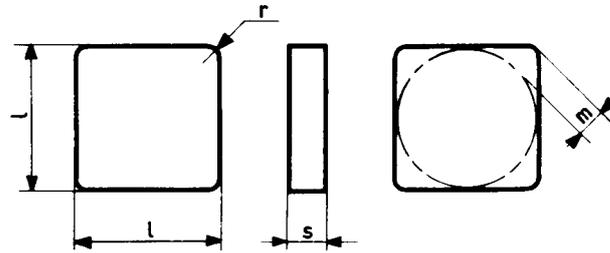


TABLE 5 - Class U (Utility ground)

Dimensions in millimetres

| Designation | nominal | <i>l</i> Tolerances | <i>s</i> ± 0.13 | <i>r</i> ± 0.10 | Dimensions in millimetres | |
|---------------|---------|------------------------|--------------------|--------------------|---------------------------|-------------------------------------|
| | | | | | nominal | <i>m</i> [*] 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)

Dimensions in millimetres

| Designation | <i>l</i> nominal | <i>s</i> ± 0.13 | <i>r</i> ± 0.10 | <i>m</i> [*] ± 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

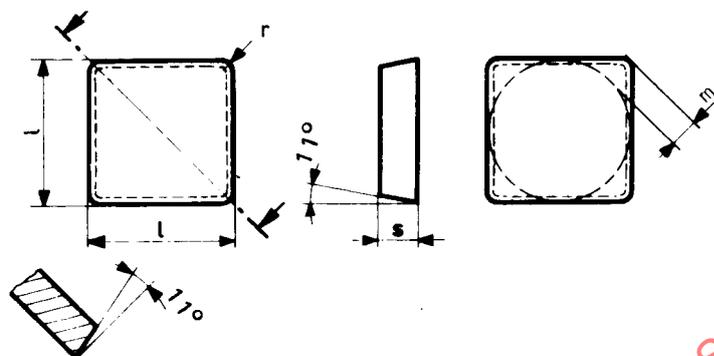


TABLE 7 - Class U (Utility ground)

Dimensions in millimetres

| Designation | nominal | <i>l</i> Tolerances | <i>s</i> ± 0.13 | <i>r</i> ± 0.10 | nominal | <i>m</i> [*] Tolerances |
|---------------|---------------|------------------------|--------------------|--------------------|---------|-------------------------------------|
| | SPUN 12 03 08 | 12.70 | ± 0.13 | 3.18 | 0.8 | 2.301 |
| 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 | <i>l</i> nominal | <i>s</i> ± 0.13 | <i>r</i> ± 0.10 | <i>m</i> [*] ± 0.025 |
|---------------|---------------------|--------------------|--------------------|----------------------------------|
| SPGN 12 03 08 | 12.70 | 3.18 | 0.8 | 2.301 |
| SPGN 12 03 12 | | | 1.2 | 2.137 |

* 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

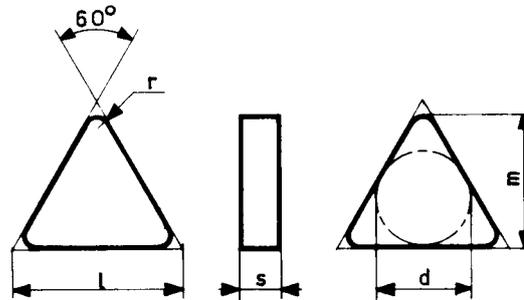


TABLE 9 - Class U (Utility ground)

Dimensions in inches

| Designation | l nominal | s ± 0.005 | r ± 0.004 | d | | m^* | |
|-------------|----------------|--------------------|--------------------|---------|-------------|---------|--------------|
| | | | | 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

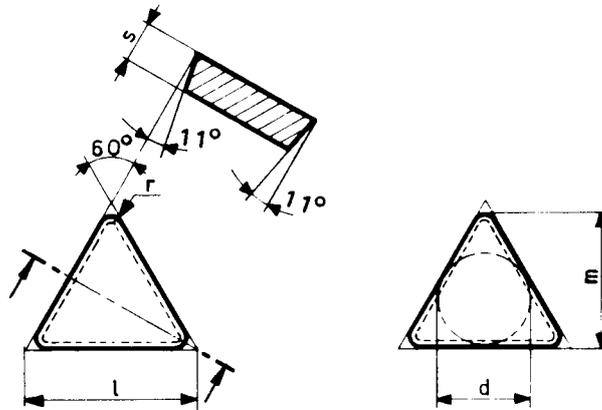


TABLE 11 - Class U (Utility ground)

Dimensions in inches

| Designation | l nominal | s ± 0.005 | r ± 0.004 | d | | m* | |
|-------------|--------------|--------------|--------------|---------|------------|---------|------------|
| | | | | nominal | Tolerances | 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 | | m* | |
|-------------|--------------|--------------|--------------|---------|------------|---------|------------|
| | | | | nominal | Tolerances | nominal | Tolerances |
| 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

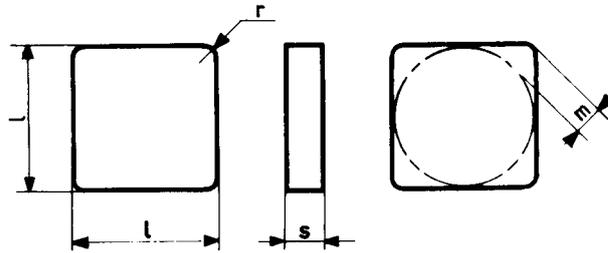


TABLE 13 - Class U (Utility ground)

Dimensions in inches

| Designation | nominal | <i>l</i> Tolerances | <i>s</i> ± 0.005 | <i>r</i> ± 0.004 | <i>m</i> * | |
|-------------|---------|------------------------|---------------------|---------------------|------------|------------|
| | | | | | 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)

Dimensions in inches

| Designation | <i>l</i> nominal | <i>s</i> ± 0.005 | <i>r</i> ± 0.004 | <i>m</i> * |
|-------------|---------------------|---------------------|---------------------|------------|
| 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

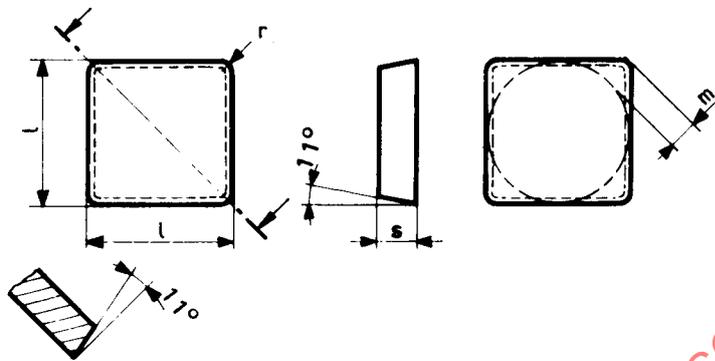


TABLE 15 - Class U (Utility ground)

Dimensions in inches

| Designation | <i>l</i> | | <i>s</i> ± 0.005 | <i>r</i> ± 0.004 | <i>m</i> * | |
|-------------|----------|------------|---------------------|---------------------|------------|------------|
| | nominal | Tolerances | | | nominal | 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)

Dimensions in inches

| Designation | <i>l</i> nominal | <i>s</i> ± 0.005 | <i>r</i> ± 0.004 | <i>m</i> * |
|-------------|---------------------|---------------------|---------------------|------------|
| 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.