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Submitted for recognition as an American National Standard

### Numbering System for Single Diameter Drills

1. **Scope**—This SAE Recommended Practice provides a systematic method for the identification of single diameter drills. It is intended to assist in the cataloging and supplying of these tools.

NOTE 1—Caution must be taken when assigning codes for designators to prevent specifying drills that cannot be physically or economically manufactured.

NOTE 2—In particular without limitation, SAE disclaims all responsibility for the accuracy or completeness of information contained within this report if the standards of this report are retrieved, combined, or used in connection with any software.

### 2. References

- 2.1 **Related Publications**—The following publications are provided for information purposes only and are not a required part of this document.

NOTE—Reference information not specified to be manufacturer's standard practices. Manufacturer to supply information for regrind upon request.

- 2.1.1 ANSI PUBLICATIONS—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ANSI B5.10—Machine Tapers

ANSI B94.11—Twist Drills

ANSI B94.11M-1979—Nomenclature, Definitions, Sizes, and tolerances of Twist Drills

- 2.1.2 NUMBERING SYSTEMS SOFTWARE—Software products may exist to assist in the use of the standard. The following software product(s) are listed for information purposes only and do not constitute part of this document. **SAE expressly disclaims any responsibility for the operation of any Software used in connection with your use of this report.**

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2.1.2.1 *Datom Engineering Software, Inc., Publication*—Available from Datom Engineering Software, Inc., 561 Somerset, Suite 3, Crystal Lake, IL 60014, (815) 477-3380.

Datom Engineering Software, Inc., TMS III-Reamers-Electronic Reference Manual Nomenclature, Definitions, Sizes, and Tolerances of Twist Drills

2.1.3 DIN PUBLICATIONS—Available from Beuth Verlag GmbH, Burggrafenstrasse 6, D-1000 Berlin 30 Germany. (The publications are also available through American National Standards Institute.)

DIN 228 Part 1—Morse Taper Shanks  
DIN 332—60 Degree Center Holes  
DIN 333—60 Degree Center Drills  
DIN 333R—Center Drills with Radius Step Angles  
DIN 338—Parallel Shank Twist Drills—Jobbers Series  
DIN 339—Parallel Shank Twist Drills for Use in Jig Bushings  
DIN 340—Parallel Shank Twist Drills—Long Series  
DIN 341—Morse Taper Shank Twist Drills—Long Series  
DIN 345—Morse Taper Shank Twist Drills for Use in Jig Bushings  
DIN 346—Morse Taper Shank Twist Drill with Oversize Shank  
DIN 1412—Twist Drill Definitions  
DIN 1414—Twist Drills of High Speed Steel—Technical Conditions of Delivery  
DIN 1809—Driving Tenons for Tools with Parallel Shanks  
DIN 1861—Twist Drills for Jig Boring Machines  
DIN 1869—Extra Length Drills Series 1, 2 and 3  
DIN 1870—Extra Length Taper Shank Drills Series 1 & 2  
DIN 1897—Stub Length Drills  
DIN 1899—Cobalt Micro Precision Drills HSCO Form A  
DIN 6539—Continuous Parallel Shank Solid Hard Metal Twist Drills  
DIN 7168 Part 1—General Tolerances; Linear and Angular Dimensions  
DIN 8037—Twist Drills wWith Parallel Shank with Carbide Tips for Drilling Metal  
DIN 8038—Twist Drills with Parallel Shank with Carbide Tips for Drilling Plastics  
DIN 8039—Parallel Shank Masonry Drills with Carbide Tips  
DIN 8041—Twist Drills with Morse Taper Shanks with Carbide Tips for Drilling Steel  
DIN 17350—Tools Steels—Technical Conditions of Delivery

2.1.4 ISO PUBLICATIONS—Available from International Organization for Standardization, 1 Rue DeVarembe, Case Postal 56, CH1211 Geneva 20 Switzerland. (The publications are also available through American National Standards Institute.)

ISO 235—Parallel shank jobbers, stub series drills and morse taper shank drills  
ISO 286/2—System of limits and fits  
ISO 296—Machine tools—Self holding tapers for tool shanks  
ISO 494—Parallel shank twist drills—Long series  
ISO 866—Centre drills for centre holes without protecting chamfers—Type A  
ISO 2306<sup>1</sup>—Drills for use prior to tapping screw threads  
ISO 2540—Centre drills for centre holes with protecting chamfer—Type B  
ISO 2541—Centre drills for centre holes with radius form—Type R  
ISO 3291—Extra long morse taper shank twist drills  
ISO 3292—Extra long parallel shank twist drills

1. Should not be included in SAE drill document reference at this time.

- ISO 3438<sup>2</sup>—Subland twist drills with morse taper shanks for holes prior to tapping screw threads
- ISO 3432<sup>2</sup>—Subland twist drills with parallel shank for holes prior to tapping screw threads
- ISO 4203—Parallel shank tools—Driving tenons and sockets
- ISO 5413—Machine tools—Positive drive of morse taper sShanks
- ISO 5419—Twist drills—Terms, definitions, and types
- ISO 7079—Core drills with parallel shanks and with morse taper shanks
- ISO 10898—Spot drills

2.1.5 USCTI PUBLICATIONS—Available from United States Cutting Tool Institute, 1300 Summer Avenue, Cleveland, OH 44115.

- Standard Drills—Handbook of Specifications
- USCTI—Handbook of Standard Drills

**3. Numbering System**

**3.1 Formats**—The basic numbering system is subdivided into two formats for drills:

- 3.1.1 **FORMAT—17 POSITION**—Drills with flute lengths and overall lengths which comply with the referenced Standards.
- 3.1.2 **FORMAT—27 POSITION**—Drills with flute lengths and/or overall lengths which do not comply with the referenced Standards.

**3.2 Content of Numbering System**—The numbering system utilizes 17 or 27 positions to fully describe the various dimensions, types, materials, and characteristics of drills.

Figure 1 illustrates the content and sequence of the 17 positions in the numbering system for drills whose flute lengths and overall lengths comply with the referenced Standards.

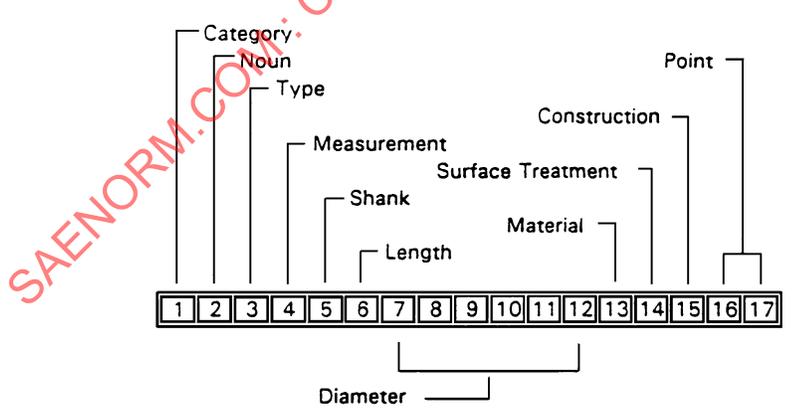


FIGURE 1—FORMAT—17 POSITION

Figure 2 illustrates the content and sequence of the 27 positions in the numbering system for drills whose flute lengths and/or overall lengths do not comply with the referenced Standards.

2. Should not be included in SAE drill document reference at this time.

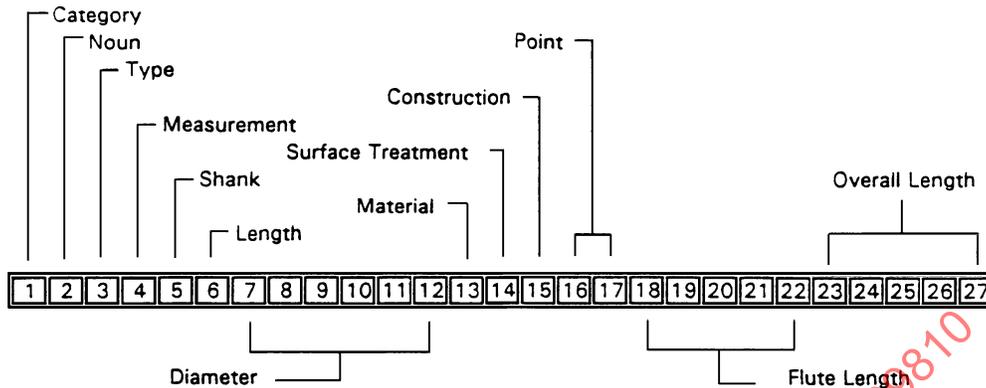


FIGURE 2—FORMAT—27 POSITION

**3.3 Positions**—The content of each position is explained in detail in the following sections:

3.3.1 POSITIONS 1 AND 2, CATEGORY AND NOUN—Positions 1 and 2 will always be alphabetical. The following designations have been assigned:

Position 1: T—designates TOOL  
Position 2: D—designates DRILL

3.3.2 POSITION 3, TYPE—Position 3 will be numeric based on the type of drill. The following codes have been assigned:

3 – Core Drill 3-Flute  
4 – Core Drill 4-Flute  
5 – Combined Drill and Countersink  
6 – Center Drill  
7 – Straight Flute  
8 – Twist Drill, 1 Flute  
9 – Twist Drill, 2 Flute  
0 – Twist Drill, 3 Flute

3.3.3 POSITION 4, MEASUREMENT SPIRAL—Position 4 will always be alphabetic. The following codes have been assigned:

C – Inch, Right Hand – ANSI Standards  
D – Inch, No Spiral – ANSI Standards  
L – Inch, Left Hand – ANSI Standards  
M – Metric, Right Hand – ANSI Standards  
N – Metric, Left Hand – ANSI Standards  
P – Metric, No Spiral – ANSI Standards  
R – Metric, No Spiral – DIN Standards  
S – Metric, No Spiral – ISO Standards  
U – Metric, Right Hand – DIN Standards  
V – Metric, Left Hand – DIN Standards  
W – Metric, Right Hand – ISO Standards  
Z – Metric, Left Hand – ISO Standards

3.3.4 POSITION 5, SHANK—Position 5 can be alpha or numeric:

- 0 – No. 0 Morse Taper
- 1 – No. 1 Morse Taper
- 2 – No. 2 Morse Taper
- 3 – No. 3 Morse Taper
- 4 – No. 4 Morse Taper
- 5 – No. 5 Morse Taper
- 6 – No. 6 Morse Taper
- P – Straight shank Precision Collet – +0.0000 to –0.0005
- S – Straight Shank
- T – Straight Shank – Tanged
- U – 1/4 in Diameter Reduced Straight Shank
- V – 3/8 in Diameter Reduced Straight Shank
- W – 1/2 in Diameter Reduced Straight Shank

NOTE—Automotive Taper Length (long flute length—

- Position 4 indicates "C" or "L"
- Position 5 indicates "S" or "T"
- Position 6 indicates "3"
- Drill diameter is over 1/2 in (0.5000 in)

Then the drills have reduced shanks as follows in Table 1.

**TABLE 1—REDUCED SHANKS**

Drill Diameter	Shank Diameter
0.5000 to 0.6250 in	0.5000 in
Over 0.6250 to 0.7344 in	0.6250 in
Over 0.7344 to 0.9219 in	0.7500 in
Over 0.9219 to 1.2500 in	0.9375 in
Over 12.80 to 15.80 mm	0.5000 in
Over 15.80 to 19.00 mm	0.6250 in
Over 19.00 to 23.50 mm	0.7500 in
Over 23.50 to 25.00 mm	0.9375 in

3.3.5 POSITION 6, LENGTH—Position 6 can be alpha or numeric. The following codes have been assigned:

NOTE—When Position 6 is an "X," then the 27 position format must be used:

- 1 – Taper Length (ANSI)/Long Series (DIN/ISO)
- 2 – Jobbers Length (ANSI)/Jobbers Series (DIN/ISO)
- 3 – Automotive Taper Length (long flute length)
- 4 – Bushing Length (DIN/ISO)
- 6 – Center Drill
- 7 – Regular Length – Solid Carbide (USCTI)
- 8 – Stub Length – Solid Carbide (USCTI)
- 9 – Screw Machine Length (ANSI)/Stub Series (DIN/ISO)
- 0 – Combination Drill and Countersink
- A – 6 in Aircraft Extension Length
- B – 12 in Aircraft Extension Length
- R – 1/4 in Reduced Shank Length
- S – 1/2 in Reduced Shank Length (Silver and Deming)
- X – Special Length

3.3.6 POSITIONS 7, 8, 9, 10, 11, AND 12, DIAMETER (METRIC OR INCH) 14, SURFACE TREATMENT—These positions will always be numeric with a decimal point as an integral part of the number.

NOTE—Use zeros for all open positions.

3.3.6.1 *Diameter—Drill (Metric)*—Position 4 indicates "M," "N," "U," "V," "W," or "Z."

The diameter will be specified to the thousandths of a millimeter, with the decimal point located in Position 9.

Maximum diameter will be (99.999 mm).

Examples:

00.900 mm  
03.250 mm  
09.750 mm  
15.000 mm  
57.500 mm  
75.500 mm

3.3.6.2 *Diameter—Drill (Inch)*—Position 4 indicates "C" or "L."

The diameter will be specified to the ten thousandths of an inch, with the decimal point located in Position 8.

Maximum diameter will be (9.9999 in).

Examples:

0.1250 in (1/8 in)  
0.1876 in (3/16 in)  
0.2500 in (1/4 in)  
0.8750 in (7/8 in)  
1.0000 in (1 in)  
1.2500 in (1-1/4 in)  
1.5000 in (1-1/2 in)  
1.7500 in (1-3/4 in)

3.3.6.3 *Diameter—Combination Drill and Countersink (Numeric)*

When Position 3 indicates a "5," and  
Position 4 indicates "C" or "L" and  
Position 5 indicates "S" and  
Position 6 indicates "0.)

Positions 11 and 12 will contain the number size of the combination drill and countersink, with a decimal point located in Position 8.

Examples:

0.0001 (#W1)  
0.0002 (#W2)  
0.0003 (#W3)  
0.0004 (#W4)  
0.0005 (#W5)  
0.0011 (#W11)  
0.0012 (#W12)  
0.0013 (#W13)  
0.0014 (#W14)  
0.0015 (#W15)

3.3.7 POSITION 13, MATERIAL DESIGNATOR—Position 13 will be alpha or numeric. The following codes have been assigned:

Manufacturer's Standard

H – High Speed Steel  
C – Cobalt High Speed Steel  
S – Solid Carbide  
T – Carbide Tipped  
P – Poly Crystalline Diamond Tipped

Other

I – High Speed Steel – M1  
J – High Speed Steel – M2  
K – High Speed Steel – M7  
L – High Speed Steel – M10  
M – Cobalt High Speed Steel – T15  
D – Cobalt HSS – M35  
E – Cobalt HSS – M42  
F – Cobalt HSS – M33  
Q – Solid Carbide – C2  
R – Solid Carbide – C5  
Z – Solid Carbide – Micrograin  
U – Carbide Tipped – C1  
V – Carbide Tipped – C2  
W – Carbide Tipped – C5  
A – Solid Carbide Head – Steel Body – Steel Shank  
B – Solid Carbide Head – Steel Shank

3.3.8 POSITION 14, SURFACE TREATMENT—Position 14 can be alpha or numeric. The following codes have been assigned:

- S – Manufacturer's Standard Treated
- 1 – Untreated (Bright)
- 2 – Steam Oxide
- 3 – Nitride Plus Steam Oxide
- 4 – Nitride Only
- 5 – Hard Chrome Plate
- 6 – Bronze Oxide
- A – Titanium Nitride
- B – Titanium Carbo Nitride
- C – Titanium Aluminum Nitride
- D – Chrome Nitride
- E – Chrome Carbide
- F – Boron Carbide
- G – Zirconium Nitride
- P – Polished Flute

3.3.9 POSITION 15, CONSTRUCTION—Position 15 can be alpha or numeric. The following codes have been assigned:

- 0 – Regular Helix
- 1 – Slow Helix
- 2 – High Helix
- 3 – Heavy Duty
- 4 – Double Margin (Regular Helix)
- 5 – Triple Margin (Regular Helix)
- 6 – Full Parabolic (No Land)
- 7 – Semi-Parabolic (Partial Land)
- 8 – Pre-Thinned Web
- 9 – Heavy-Duty Blend Thin 2X Diameter
- A – NAS 907 Type A
- B – NAS 907 Type B
- C – NAS 907 Type C
- D – NAS 907 Type D
- E – NAS 907 Type E
- J – NAS 907 Type J
- I – Coolant—No Spiral, End Feed
- K – Coolant—Slow Spiral, End Feed
- L – Coolant—Slow Spiral, Side Feed
- M – Coolant—Slow Spiral, Inducer Feed
- N – Coolant—Reg. Spiral, End Feed
- R – Coolant—Reg. Spiral, Side Feed
- P – Coolant—Reg. Spiral, Inducer Feed
- T – Crank Shaft (Manufacturer's Standard)
- W – Crank Shaft – Double Margin (Manufacturer's Standard)
- F – Body Drill (cleared)
- G – Galley Hole
- H – Half Round
- V – Chipbreaker
- S – Stove Burner (cleared)
- U – Body Drill Uncleared (Regular Helix)
- Y – Stove Burner Uncleared (Regular Helix)
- Z – No Helix

3.3.10 POSITIONS 16 AND 17, POINT—Positions 16 and 17 will be alpha and/or numeric. The following codes have been assigned:

- 00 – 118 Degree Split Point NAS P-5
- 01 – 135 Degree Split Point NAS P-3
- 02 – 135 Degree Split Point NAS P-9
- 15 – 60 Degree Point
- 20 – 90 Degree Point
- 23 – 90 Degree Notched Point (Manufacturer's Standard)
- 25 – 90 Degree Split Point
- 26 – 90 Degree x 60 Degrees Double Angle Point
- 28 – 100 Degree Point
- 33 – 118 Degree Point
- 35 – 118 Degree Four Facet Point
- 36 – 118 Degree Four Face Split Point
- 37 – 118 Degree Notched Point (Manufacturer's Standard)
- 39 – 118 Degree Helical Point
- 40 – 118 Degree Split Point
- 41 – 118 Degree x 60 Degrees Double Angle Point
- 42 – 118 Degree x 90 Degrees Double Angle Point
- 43 – 118 Degree x 90 Degrees Double Angle Split Point
- 45 – 118 Degree Flat Lip Web Thinning Point
- 49 – 130 Degree Point
- 50 – 130 Degree Notched Point (Manufacturer's Standard)
- 51 – 130 Degree Split Point
- 52 – 130 Degree Bickford Point
- 53 – 130 Degree Helical Point
- 56 – 135 Degree Point
- 57 – 135 Degree Chipbreaker Point (Manufacturer's Standard)
- 58 – 135 Degree Notched Point
- 60 – 135 Degree Split Point
- 61 – 135 Degree Four Facet Point
- 62 – 140 Degree Point
- 63 – 140 Degree Four Facet Point
- 64 – 150 Degree Point
- 65 – 150 Degree x 90 Double Angle Point
- 69 – 180 Degree Point (Flat Bottom)
- 85 – Racon Point (Manufacturer's Standard)
- 86 – Fishtail Point
- 87 – Radial Lip

3.3.11 POSITIONS 18, 19, 20, 21, AND 22, FLUTE LENGTH (METRIC OR INCH)—Position 6 indicates an "X" for special length.

These positions will always be numeric, with a decimal point as an integral part of the number.

NOTE—Use zeros for all open positions.

3.3.11.1 *Flute Length—Drill (Metric)*—Position 4 indicates "M," "N," "U," "V," "W," or "Z."

The flute length will be specified to the one-tenth of a millimeter, with the decimal point located in Position 21.

Maximum flute length will be (999.9 mm).

Examples:

120.6 mm  
158.7 mm  
212.6 mm  
247.6 mm  
260.3 mm  
282.4 mm

3.3.11.2 *Flute Length—Drill (Inch)*—Position 4 indicates "C" or "L."

The flute length will be specified to the one-hundredth of an inch, with the decimal point located in Position 20.

Maximum flute length will be (99.99 in).

Examples

04.75 in  
06.25 in  
08.37 in  
09.75 in  
10.25 in  
11.12 in

3.3.12 POSITIONS 23, 24, 25, 26, AND 27, OVERALL LENGTH (METRIC OR INCH)—Position 6 indicates an "X" for special length.

These positions will always be numeric, with a decimal point as an integral part of the number.

NOTE—Use zeros for all open positions.

3.3.12.1 *Overall Length—Drill (Metric)*—Position 4 indicates "M," "N," "U," "V," "W," or "Z."

The overall length will be specified to the one-tenth of a millimeter, with the decimal point located in Position 26.

Maximum overall length will be (999.99 mm).

Examples:

174.5 mm  
244.3 mm  
292.1 mm  
349.2 mm  
390.4 mm  
460.2 mm

3.3.12.2 Overall Length—Drill (Inch)—Position 4 indicates "C" or "L."

The overall length will be specified to the one-hundredth of an inch, with the decimal point located in Position 25.

Maximum overall length will be (99.99 in).

Examples:

06.87 in  
09.62 in  
11.50 in  
13.75 in  
15.37 in  
18.12 in

4. Examples

TD9CS20.2500H0033—1/4 in (0.2500) Diameter, HSS, Straight Shank, 2-Flute Right Hand Spiral, Jobbers Length, 2-3/4 in Flt Lgth., 4 in OAL, Standard Treated, Regular Helix 118 Degree Point Drill.

TD4CS10.5000H0033—1/2 in (0.5000) Diameter, HSS, Straight Shank, 4-Flute Right Hand Spiral, Taper Length, 4-3/4 in Flt Lgth., 7-3/4 in OAL, Standard Treated, Regular Helix 118 Degree Point Core Drill.

TD9LS91.1250H0033—1-1/8 in (1.1250) Diameter, HSS, Straight Shank, 2-Flute Right Hand Spiral, Taper Length, 5-3/8 in Flt Lgth., 6 in OAL, Standard Treated, Regular Helix 118 Degree Point Reduced Shank in 1 Diameter Drill.

TD9MS208.600HA760—8.600 mm (0.3386) Diameter, HSS, Straight Shank, 2-Flute Right Hand Spiral, Jobbers Length, 87.00 mm (3-7/16 in) Flt Lgth., 121.00 mm (4-3/4 in) OAL, Titanium Nitride, Semi-Parabolic (Partial Land) 135 Degree Split Point Drill

TD9CTX0.2500H0033/01.50-05.25—1/4 in (0.2500) Diameter, HSS, Straight Shank with Tang, 2-Flute Right Hand Spiral, Special Length, 1-1/2 in Flute Length, 5-1/4 OAL, Standard Treated, Regular Helix 118 Degree Point Drill.

5. Notes

5.1 Marginal Indicia—The change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

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