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Submitted for recognition as an American National Standard

Numbering System for Taps

1. **Scope**—This SAE Recommended Practice provides a systematic method for the identification of ground thread taps for inch sizes up to 9.999 in with a Maximum Thread-per-Inch of 99.9, and Metric sizes up to 99.9 mm with a Maximum pitch of 9.99 mm. It is intended to assist in the cataloging and supplying of these tools. It is not intended for ACME, Buttress, or similar type thread forms.

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

NOTE 2—The Code Number coming from the manufacturer MUST reflect the actual tool construction.

NOTE 3—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 **Applicable Publications**—The following publications (latest revision) form a part of the specification to the extent specified herein.

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

- 2.1.1 **ASME PUBLICATIONS**—Available from American Society of Mechanical Engineers Order Department, 22 Law Drive, Box 2300, Fairfield, New Jersey 07007-2300. (The publications are also available through American National Standards Institute.)

ASME B94.9—Taps—Cut and Ground Threads

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

- 2.2.1 **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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2.2.1.1 *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-Drills-Electronic Reference Manual Nomenclature, Definitions, Sizes, and Tolerances of Twist Drills

2.2.2 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 529—Short machine taps and hand taps—Second Edition

ISO 2283—Long shank machine taps with nominal diameters from 3 to 24 mm and 1/8 to 1 in—First Edition (Amendment 1-1977) (Erratum—Aug. 1976)

ISO 2284—Hand taps for parallel and taper pipe threads—General dimensions and marking—Third Edition

ISO 2857—Ground thread taps for ISO metric threads of tolerances 4H to 8H and 4G to 6G Course and fine pitches—Manufacturing tolerances on the threaded portion—First Edition—(Amendment 1-1984) (Amendment 2-1986) (Corrigendum 1-1990)

ISO 5967—Taps and thread cutting—Nomenclature of the main types and terminology—First Edition

ISO 5969—Ground thread taps for pipe threads G series and Rp series—Tolerances on the threaded portion—First Edition—(Corrigendum 1-1991)

ISO 8051—Long shank taps with nominal diameters from M3 to M10—Taps with reinforced shank and recess—First Edition

ISO 8830—High speed steel machine taps with ground threads—Technical specifications—First Edition

2.2.3 JIS PUBLICATIONS—Available from Japanese Industrial Standards Committee, c/o Standards Department, Agency of Industrial Science and Technology, Ministry of International Trade and Industry, 1-3-1, Kasumigaseki, Chiyoda-ku, Tokyo 100, Japan. (The publications are also available through American National Standards Institute.)

JIS B4430—Short Machine Taps and Hand Taps for Metric Threads Errata—1994

JIS B4432—Hand Taps for Unified Coarse Thread

JIS B4433—Nut Taps

JIS B4438—Hand Taps for Unified Fine Thread

JIS B4439—Hand Taps for Sewing Machine Thread

JIS B4445—Hand Taps for Pipe Threads for Parallel Threads

JIS B4446—Hand Taps for Pipe Threads for Taper Threads

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

Handbook of Standard Taps

3. Numbering System

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

3.1.1 **FORMAT—21 POSITION**—Taps with overall lengths which comply with the referenced Standards.

3.1.2 **FORMAT—26 POSITION**—For Extension, Pulley, and Other Taps with overall lengths which do not comply with the referenced Standards.

3.2 Content of Numbering System—The numbering system utilizes 21 and 26 positions to fully describe the various dimensions, types, materials, and characteristics of taps.

Figure 1 illustrates the content and sequence of the 21 positions in the numbering system for taps whose overall lengths comply with the referenced Standards.

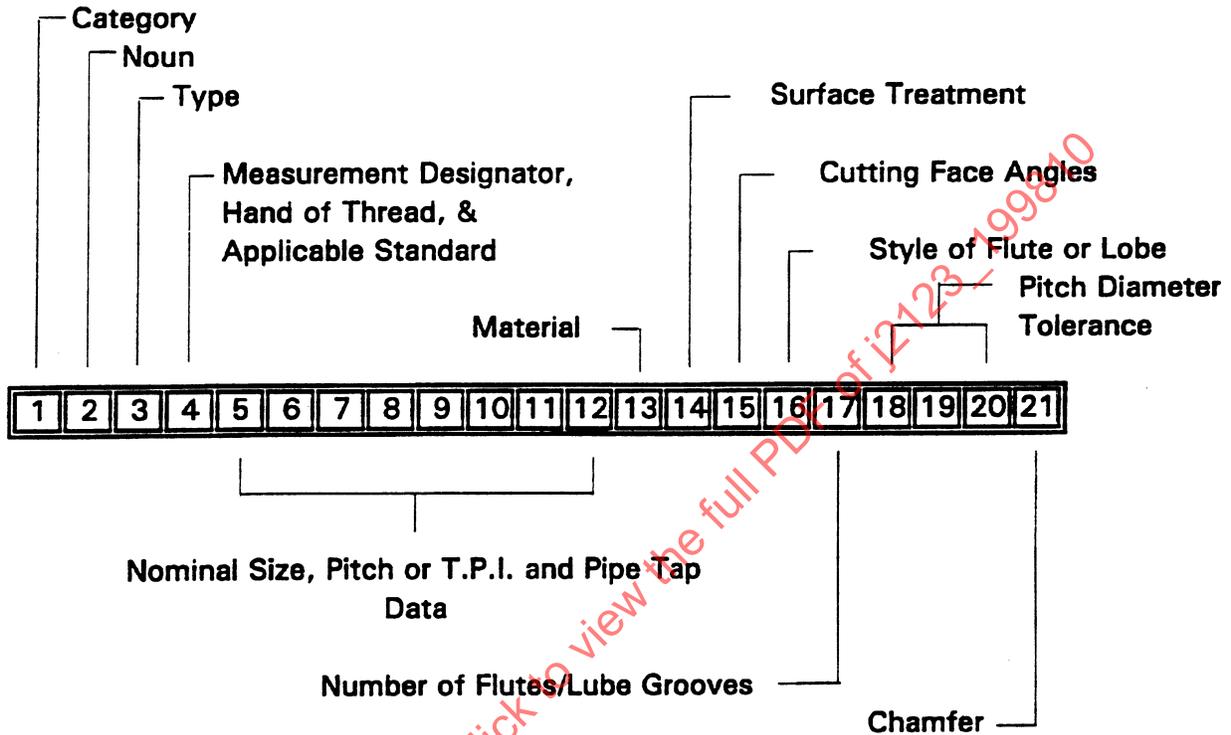


FIGURE 1—21 POSITION FORMAT

Figure 2 illustrates the content and sequence of the 26 positions in the numbering system for extension taps, pulley taps, and taps whose overall lengths do not comply with the referenced Standards.

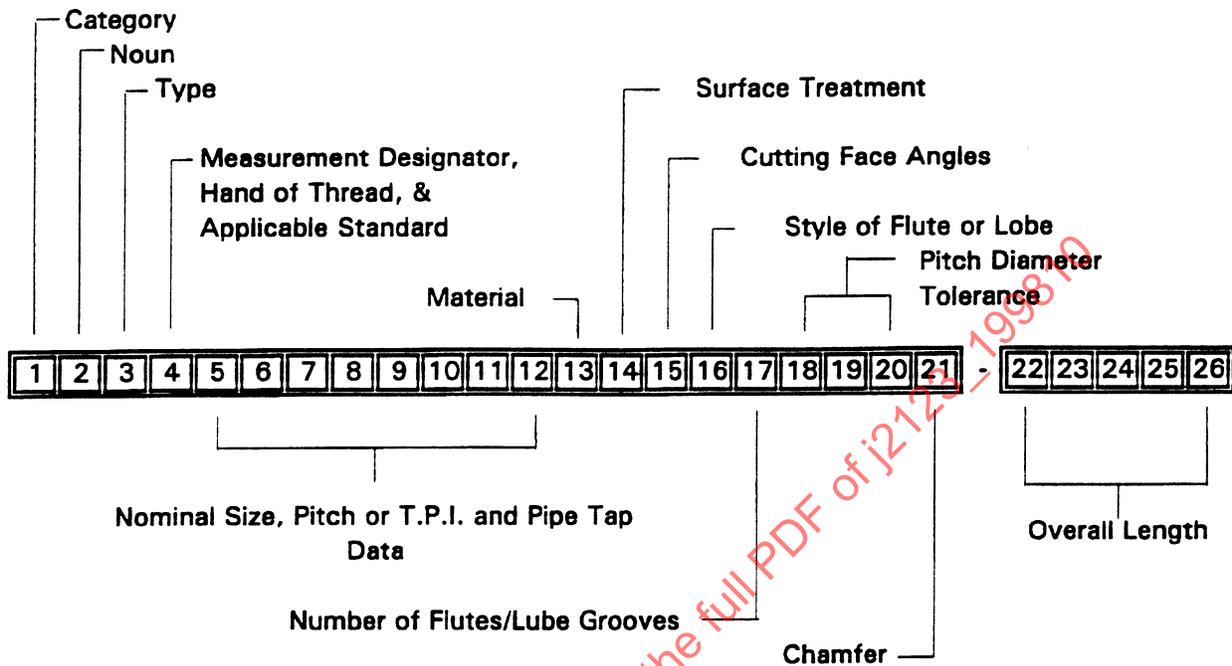


FIGURE 2—26 POSITION FORMAT

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: T—designates TAP

3.3.2 POSITION 3, TYPE—Position 3 will be alpha or numeric based on the type of tap. The following codes have been assigned for taps without oil holes:

- 1 – Standard Straight Thread (Fractional, Machine Screw, or Metric)
- 2 – Taper Pipe
- 3 – Straight Pipe
- 4 – Pulley
- 5 – Nut
- 6 – Thread Forming
- 7 – Standard Straight Thread—Screw Thread Insert (S.T.I.)
- 8 – Extension
- 9 – Short Thread Length
- W – Taper Pipe—Small Shank (1/8 in nominal diameter)
- X – Straight Pipe—Small Shank (1/8 in nominal diameter)

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The following codes have been assigned for taps with thru oil holes:

- A – Standard Straight Thread (Fractional, Machine Screw, or Metric) with oil hole
- B – Taper Pipe – with oil hole
- C – Straight Pipe – with oil hole
- D – Pulley – with oil hole
- E – Nut – with oil hole
- F – Thread Forming – with oil hole
- G – Standard Straight Thread – Screw Thread Insert (S.T.I.) – with oil hole
- H – Extension – with oil hole
- I – Short Thread Length – with oil hole
- Y – Taper Pipe – Small Shank (1/8 in nominal diameter) – with oil hole
- Z – Straight Pipe – Small Shank (1/8 in nominal diameter) – with oil hole

3.3.3 POSITION 4, MEASUREMENT DESIGNATOR, HAND OF THREAD, AND APPLICABLE INDUSTRY STANDARD FOR GENERAL DIMENSIONS—Position 4 will be alpha or numeric. The following codes have been assigned:

- C – Right Hand – Inch – ASME/ANSI Standards
- L – Left Hand – Inch – ASME/ANSI Standards
- M – Right Hand – Metric – ASME/ANSI Standards
- N – Left Hand – Metric – ASME/ANSI Standards
- U – Right Hand – Metric – DIN Standards
- V – Left Hand – Metric – DIN Standards
- W – Right Hand – Metric – ISO Standards
- Z – Left Hand – Metric – ISO Standards
- J – Right Hand – Metric – JIS Standards
- S – Left Hand – Metric – JIS Standards

3.3.4 POSITION 5, 6, 7, 8, 9, 10, 11, AND 12, NOMINAL SIZE (DIAMETER) AND PITCH—There are three formats used for Nominal Size and Pitch depending on whether the tap threads are metric, inch, or pipe sizes.

NOTE—Use zeros for all open positions.

3.3.4.1 *Nominal Size and Pitch—Tap (Metric)*—When Position 4 indicates “M,” “N,” “U,” “V,” “W,” “Z,” “J,” or “S”

Nominal size will be specified to the nearest tenth of a millimeter (one place to the right of the decimal point) with an “M” located in Position 5. It is assumed that there is a decimal point located between Positions 7 and 8.

Position 9 will always have an “X” to separate metric nominal size and pitch.

Pitch will be specified to the nearest hundredth of a millimeter (two places to the right of the decimal point). It is assumed that there is a decimal point located between Positions 10 and 11.

Maximum nominal size will be (99.9 mm)

Maximum pitch will be (9.99 mm)

Examples:

M 0 1 6 x 0 3 5 (M 1.6 x 0.35)
 M 0 8 0 x 1 2 5 (M 8 x 1.25)
 M 2 4 0 x 3 0 0 (M 24 x 3)
 M 3 0 0 x 3 5 0 (M 30 x 3.5)

3.3.4.2 *Nominal Size and Threads Per Inch—Tap (Inch)—When Position 4 indicates “C” or “L”*

Nominal Size will be specified to the nearest ten thousandths of an inch (four places to the right of the decimal point). It is assumed that there is a decimal point located between Positions 5 and 6.

Maximum nominal size will be (9.9999 in).

Threads per Inch (TPI) will be specified to the nearest tenth of a TPI (one place to the right of the decimal point). It is assumed that there is a decimal point located between Positions 11 and 12, allowing for a decimal part of TPI, such as 11.5 or 04.5.

Maximum threads per Inch will be (99.9).

Examples:

0 2 5 0 0 2 0 0 (1/4 (0.2500) – 20 NC)
 0 1 9 0 0 3 2 0 (#10 (0.1900) – 32 NF)
 0 6 8 7 5 1 6 0 (11/16 (0.6875) – 16 NS)
 2 0 0 0 0 0 4 5 (2.0 in – 4.5 NC)

Reference Table of Decimal Equivalents for Machine Screw Sizes (see Table 1).

TABLE 1—DECIMAL EQUIVALENTS FOR MACHINE SCREW SIZES

Machine Screw No.	Decimal Equivalent
0	0.0600
1	0.0730
2	0.0860
3	0.0990
4	0.1120
5	0.1250
6	0.1380
8	0.1640
10	0.1900
12	0.2160

3.3.4.3 *Nominal Size and Pitch—Pipe Taps—When Position 3 indicates:*

- "2" (Taper Pipe)
- "3" (Straight Pipe)
- "B" (Taper Pipe – with oil hole)
- "C" (Straight Pipe – with oil hole)
- "W" (Taper Pipe – Small Shank)
- "X" (Straight Pipe – Small Shank)
- "Y" (Taper Pipe – Small Shank – with oil hole)
- "Z" (Straight Pipe – Small Shank – with oil hole)

Nominal Size will be specified to the nearest thousandths of an inch (three places to the right of the decimal point). It is assumed that there is a decimal point located between Positions 5 and 6.

Threads per Inch will be the standard for the Pipe Nominal Size shown and not entered into this format.

Maximum nominal size will be (8.000 in).

Minimum nominal size will be (0.063 = 1/16 in).

Pipe Thread Form will be designated in Position 9. The following codes have been assigned:

- A – NPT – Regular Taper
- B – NPT – Regular Taper with Interrupted Threads
- C – NPTF – Dryseal Taper
- D – NPTF – Dryseal Taper with Interrupted Threads
- E – PTF – Dryseal SAE Short Taper
- F – PTF – Dryseal SAE Short Taper with Interrupted Threads
- G – NPSI – Dryseal Straight Intermediate
- H – NPS – Standard Straight Pipe (NPSC or NPSM)
- I – NPSF – Dryseal Straight
- J – ANPT – Aeronautical Taper (NPT)
- K – NPSH – Straight Pipe for Hose Couplings and Nipples
- L – NPSL – Straight Pipe for Locknuts
- M – NGT – National Gas Taper (NPT)
- N – NGS – National Gas Straight
- P – NGO – National Gas Outlet

Taper Pipe Tap Projection Through Standard L1 Ring Gage will be designated in nearest thousandth of an inch (three places to the right of the decimal point), using Positions 10, 11, and 12. It is assumed there is a decimal point located between Positions 9 and 10.

For Taper Pipe Taps with standard projection use letters STD in Positions 10, 11, and 12.

For Taper Pipe Taps with other than standard projection, use Positions 10, 11, and 12 to designate decimal projection length.

Maximum decimal projection length will be (0.999 in).

For Straight Pipe Taps, Positions 10, 11, and 12 will be filled in with zeros (000).

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Examples:

8 0 0 0 A S T D (8 in – 8 NPT STD Proj.)
4 0 0 0 A 9 5 0 (4 in – 8 NPT .950 Proj.)
0 3 7 5 F S T D (3/8 in – 18 PTF STD Int.)
0 0 6 3 1 0 0 0 (1/16 in – 27 NPSF)

3.3.5 POSITION 13, MATERIAL—Position 13 will be alpha or numeric. Manufacturer's Standard should be used unless proven that a specific material must be used for a specific application. The following codes have been assigned:

Manufacturer's Standard

- H – High Speed Steel
- C – Cobalt High Speed Steel (at least 4.5% Cobalt)
- V – Vanadium High Speed Steel (at least 2.6% Vanadium)
- E – Cobalt/Vanadium High Speed Steel (at least 4.5% Cobalt or at least 2.6% Vanadium)
- 7 – Cobalt/Vanadium High Speed Steel (at least 4.5% Cobalt and at least 2.6% Vanadium)
- 8 – Tungston High Speed Steel
- 9 – Tungston/Cobalt High Speed Steel
- S – Solid Carbide
- T – Carbide Tipped
- Z – Solid Carbide – Micro Grain

Other (To be used only in select instances where a specific material has proven to be a key factor.)

- | | |
|-----------------------------|-----------|
| I – High Speed Steel | M1 |
| J – High Speed Steel | M2 |
| 2 – High Speed Steel | M3 Type 2 |
| K – High Speed Steel | M7 |
| L – High Speed Steel | M10 |
| M – Cobalt High Speed Steel | T15 |
| D – Cobalt High Speed Steel | M35 |
| 5 – Cobalt High Speed Steel | M42 |
| F – Cobalt High Speed Steel | M33 |
| Q – Solid Carbide | C2 |
| N – Solid Carbide | C3 |
| R – Solid Carbide | C5 |
| G – Carbide Inserted | |

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

S – Manufacturer's Standard Treated (for ordering purposes only)

Other

- 1 – Untreated (Bright)
- 2 – Steam Oxide
- 3 – Nitride Plus Steam Oxide
- 4 – Nitride Only
- 6 – Bronze Oxide (Straw Draw)
- A – Titanium Nitride (TiN)
- B – Titanium Carbo Nitride (TiCN)
- C – Titanium Aluminum Nitride (TiAlN)
- D – Chrome Nitride (CrN)
- E – Chrome Carbide (CrC)
- F – Boron Carbide (BC)
- G – Zirconium Nitride (ZrN)
- H – Chrome (Cr)

3.3.7 POSITION 15, CUTTING FACE ANGLE—When Position 3 indicates:

“6” (Thread Forming)

“F” (Thread Forming—with oil hole)

Then Position 15 will always be “0” (No Rake or Hook).

The values listed reflect the typical range that can be expected due to manufacturing tolerance and the difference in measurement techniques.

Position 15 will be numeric. The following codes have been assigned:

- 1 – Negative Hook -6 to 0
- 2 – Zero Hook -3 to +3
- 3 – Medium Hook >+3 to +9
- 4 – High Hook +10 to +16
- 5 – Negative Rake -6 to 0
- 6 – Zero Rake -3 to +3
- 7 – Medium Rake >+3 to +9
- 8 – High Rake +10 to +16
- 0 – No Rake or Hook (Thread Forming Tap)

NOTE—Hook angles shown are Chordal Hook, which is defined in ASME/ANSI B94.9. Taps as the angle made between a radial line from the tap major diameter to centerline and a line from the tap major diameter that passes through the basic minor diameter of the tap.

3.3.8 POSITION 16, STYLE OF FLUTE OR LOBE—Position 16 will be alphabetical. The following codes have been assigned:

- A – Straight Flute
- B – Straight Flute – Interrupted Thread
- C – Spiral Point
- D – Spiral Point – Interrupted Thread
- E – Spiral Point Only
- F – Heavy-Duty Spiral Point
- G – Heavy-Duty Spiral Point – Interrupted Thread
- H – Regular Right Hand Spiral Flute (25 to 39 degrees)
- I – Fast Right Hand Spiral Flute (40 to 60 degrees)
- J – Slow Right Hand Spiral Flute (less than 25 degrees)
- K – Heavy-Duty Right Hand Spiral Flute (Manufacturer's Standard)
- L – Regular Left Hand Spiral Flute (25 to 39 degrees)
- M – Fast Left Hand Spiral Flute (40 to 60 degrees)
- N – Slow Left Hand Spiral Flute (less than 25 degrees)
- O – Heavy-Duty Left Hand Spiral Flute (Manufacturer's Standard)
- P – Straight Lobe (Manufacturer's Standard)
- Q – Spiral Lobe (Manufacturer's Standard)

3.3.9 POSITION 17, NUMBER OF FLUTES OR LUBE GROOVES—When Position 3 indicates:

- “6” (Thread Forming)
- “F” (Thread Forming—with oil hole)

Then Position 17 indicates Number of Lube Grooves. Otherwise, Position 17 indicates number of Flutes.

Position 17 will be alpha or numeric. The following codes have been assigned:

- S—Manufacturer's Standard (for ordering purposes only)
- 0 – 0
- 1 – 1
- 2 – 2
- 3 – 3
- 4 – 4
- 5 – 5
- 6 – 6
- 7 – 7
- 8 – 8
- 9 – 9
- A – 10
- B – 11
- C – 12
- D – 13
- E – 14
- F – 16

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3.3.10 POSITIONS 18, 19, AND 20 PITCH DIAMETER SIZE AND DIRECTION FROM BASIC—Positions 18, 19, and 20 will be alpha or numeric depending on the type of tap.

3.3.10.1 For all ground form taps EXCEPT Pipe Taps, which are specified in 3.3.10.2 and 3.3.10.3.

The designation for the pitch diameter limits is used as follows:

H	– Inch	Above Basic
L	– Inch	Below Basic
D	– Metric	Above Basic
U	– Metric	Below Basic

For a General Purpose (Manufacturer's Standard) Tap with an unspecified tolerance, Positions 18, 19, and 20 will be "XXX."

Examples:

H	0 3	H3 Limit
L	0 5	L5 Limit
D	0 7	D7 Limit
U	0 9	U9 Limit
H	1 1	H11 Limit (+0.005 for inch taps)
D	1 5	D15 Limit (for metric taps)
X	X X	General Purpose (Manufacturer's Standard)—Unspecified Tolerance

3.3.10.2 *Straight Pipe Taps*—When Position 3 indicates:

"3"	(Straight Pipe)
"X"	(Straight Pipe—Small Shank)
"C"	(Straight Pipe—w/oil hole)
"Z"	(Straight Pipe—Small Shank—w/oil hole)

Then Position 18, 19, and 20 will always be "GRD" (Ground Thread—Standard Pitch Diameter—Pipe)

Example:

G RD Ground Thread—Standard Pitch Diameter—Pipe

3.3.10.3 *Taper Pipe Taps*—When Position 3 indicates:

"2"	(Taper Pipe)
"W"	(Taper Pipe—Small Shank)
"B"	(Taper Pipe—w/oil hole)
"Y"	(Taper Pipe—Small Shank—w/oil hole)

and Position 10, 11, and 12 is "STD"

Then Position 18, 19, and 20 will always be "GRD" (Ground Thread—Standard Projection—Pipe)

When Position 10, 11, and 12 contain a numeric value (Projection Length)

Then Position 18, 19, and 20 will be "GRS" (Ground Thread Special Projection)