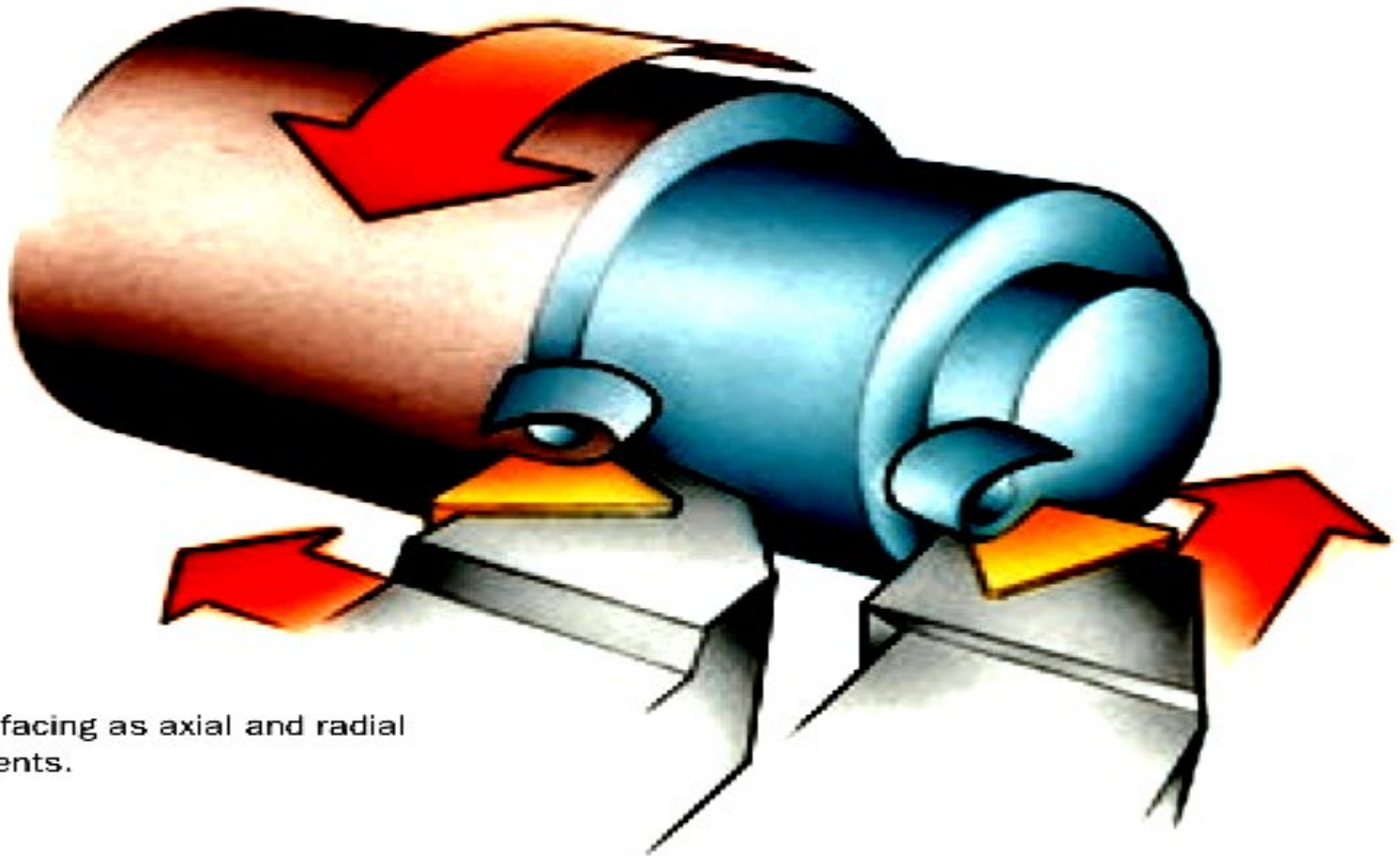




# Beginning Machining

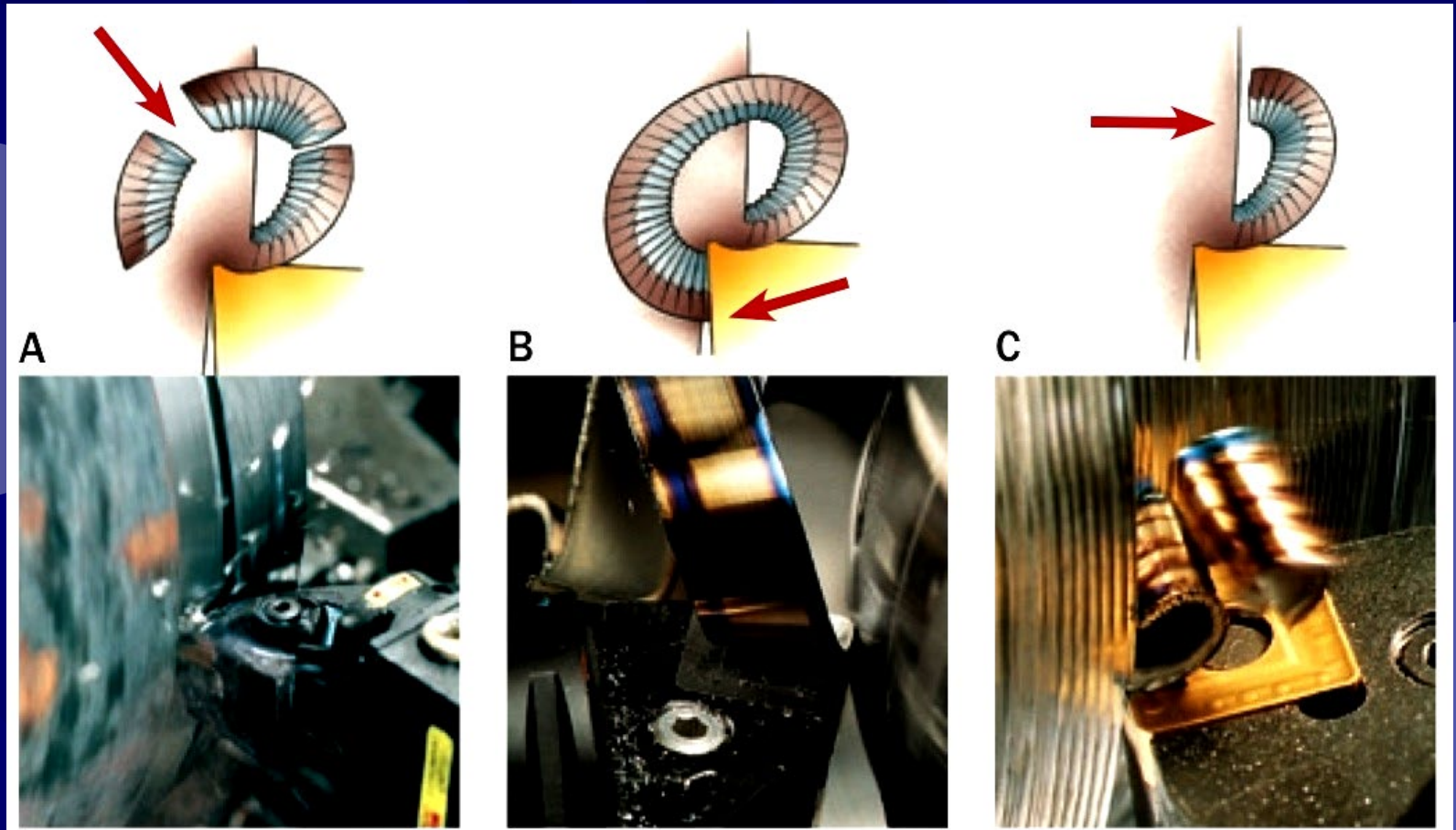
- Cutting Tools & Chip Formation

# Basic Turning Concepts

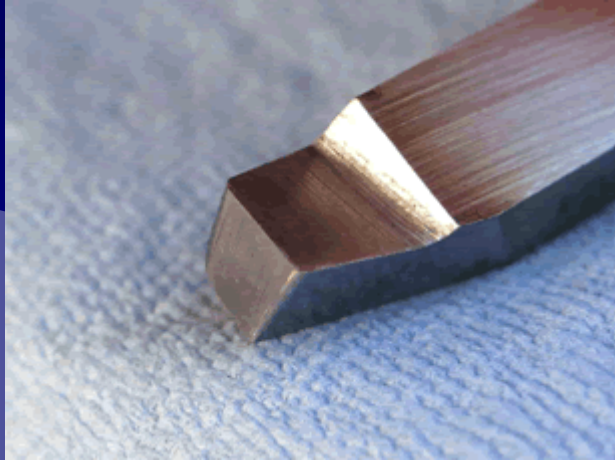


Turning and facing as axial and radial tool movements.

# Three Methods of Chip Breaking



# Sample Lathe Cutting Tools



Modern Metal Cutting - Sandvik

## Common Types of Tool Bits

- High Speed Steel (Hand Ground)
- Sintered Carbide
- Indexible Carbide

# Basic Carbide Insert Shapes

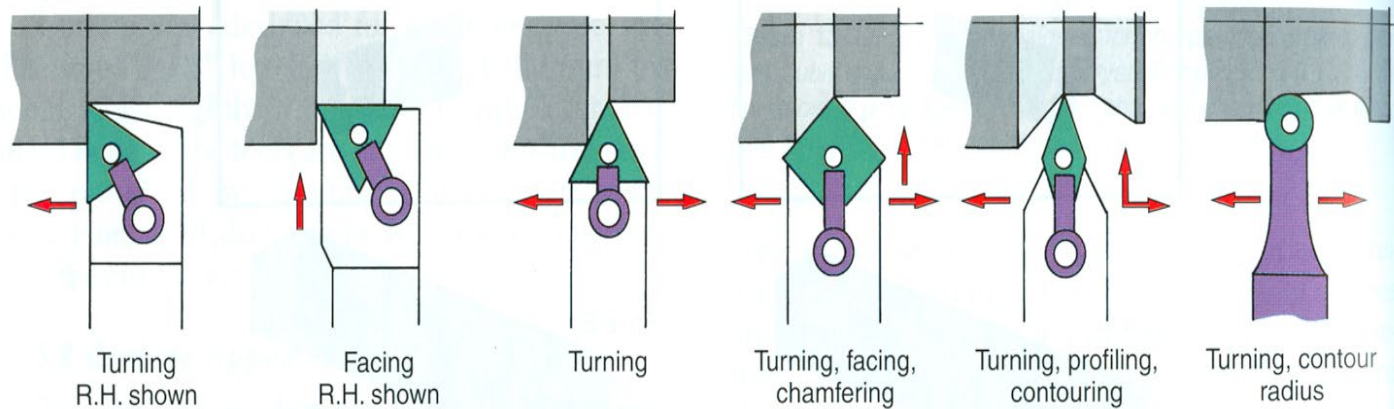
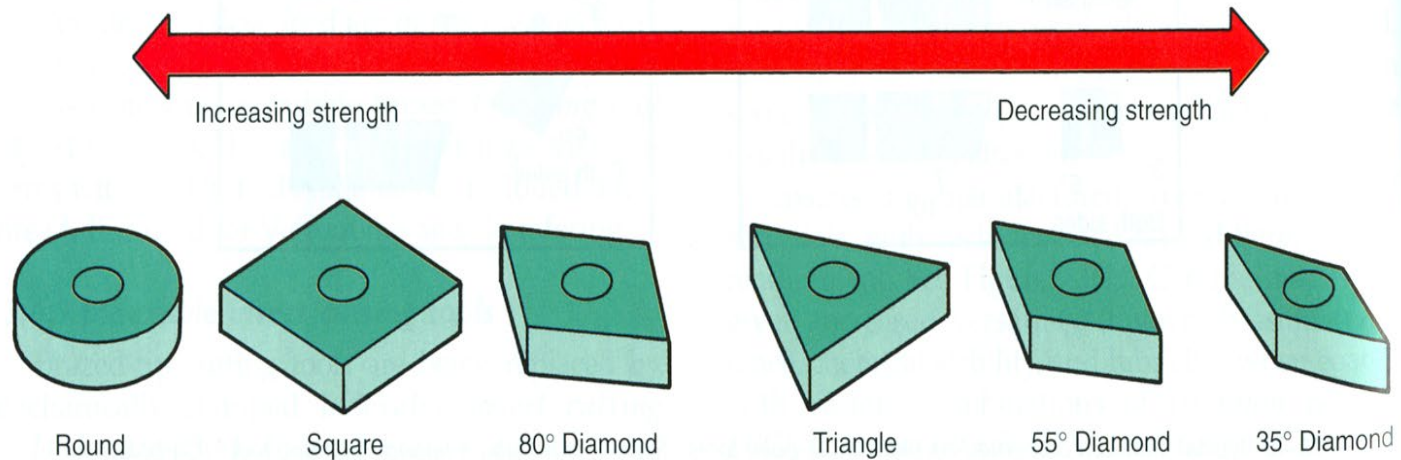

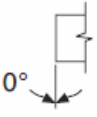
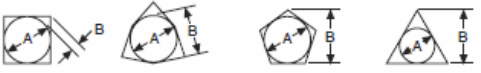




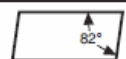

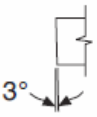



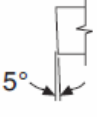


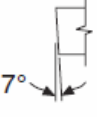



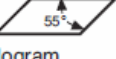


Figure 13-42. Indexable inserts are manufactured in a number of different shapes and sizes for different turning operations.



# Carbide Identification

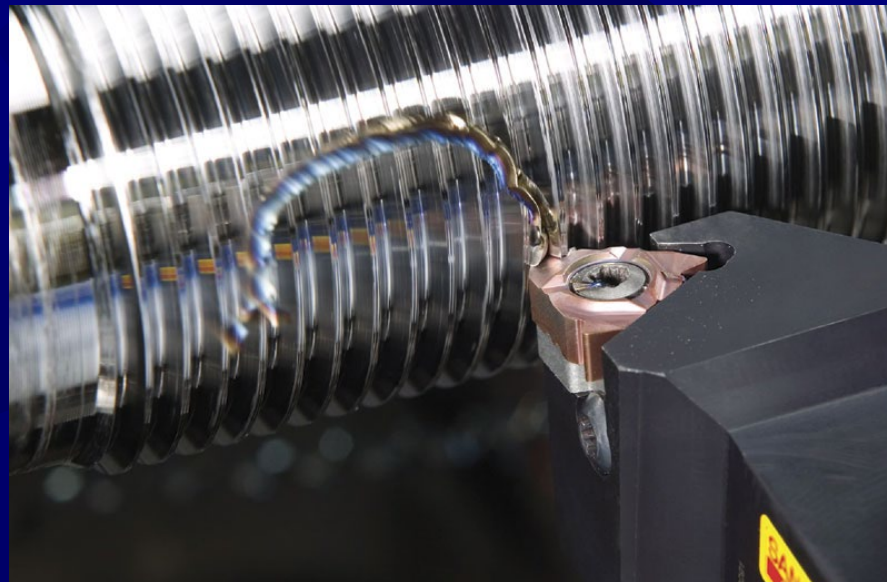
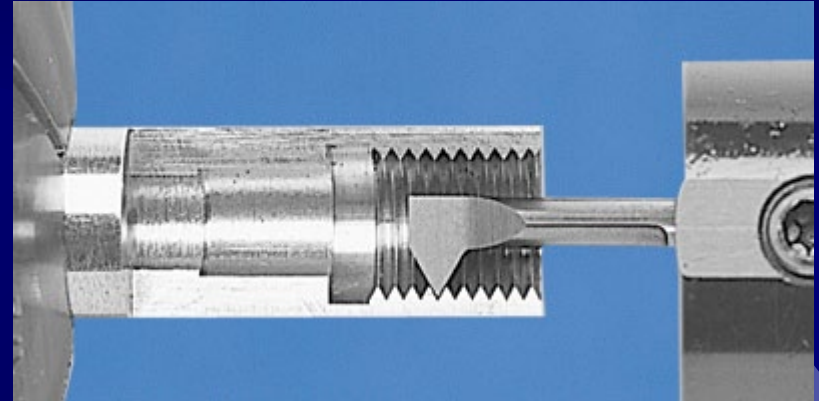
Identification chart

S	N	C	N	4																																																															
1	2	3	4	5																																																															
SHAPE	CLEARANCE	TOLERANCE CLASS	TYPE	SIZE (I.C.)																																																															
<b>A</b>  Parallelogram	<b>N</b>  0°	 Tolerance on Dimensions ( ± from nominal)	<b>A</b>  <b>B</b>  <b>C</b> 	 I.C.  For equal sided inserts this indicates the inscribed circle (I.C.) in 1/8 of an inch.  Examples: 1/8" = 1 5/32" = 1.2 3/16" = 1.5 7/32" = 1.8 1/4" = 2																																																															
<b>B</b>  Parallelogram																																																																			
<b>C</b>  Diamond	<b>A</b>  3°	<table border="1"> <thead> <tr> <th rowspan="2">Tolerance Letter</th> <th colspan="3">Dimension</th> </tr> <tr> <th>B</th> <th>A</th> <th>T</th> </tr> </thead> <tbody> <tr><td>A</td><td>0.0002</td><td>0.0010</td><td>0.001</td></tr> <tr><td>B</td><td>0.0002</td><td>0.0010</td><td>0.005</td></tr> <tr><td>C</td><td>0.0005</td><td>0.0010</td><td>0.001</td></tr> <tr><td>D</td><td>0.0005</td><td>0.0010</td><td>0.005</td></tr> <tr><td>E</td><td>0.0010</td><td>0.0010</td><td>0.001</td></tr> <tr><td>F</td><td>0.0002</td><td>0.0005</td><td>0.001</td></tr> <tr><td>G</td><td>0.0010</td><td>0.0010</td><td>0.005</td></tr> <tr><td>H</td><td>0.0005</td><td>0.0005</td><td>0.001</td></tr> <tr><td>J</td><td>0.0002</td><td>*</td><td>0.001</td></tr> <tr><td>K</td><td>0.0005</td><td>*</td><td>0.001</td></tr> <tr><td>L</td><td>0.0010</td><td>*</td><td>0.001</td></tr> <tr><td>M</td><td>*</td><td>*</td><td>0.005</td></tr> <tr><td>U</td><td>*</td><td>*</td><td>0.005</td></tr> <tr><td>N</td><td>*</td><td>*</td><td>0.001</td></tr> </tbody> </table>	Tolerance Letter		Dimension			B	A	T	A	0.0002	0.0010	0.001	B	0.0002	0.0010	0.005	C	0.0005	0.0010	0.001	D	0.0005	0.0010	0.005	E	0.0010	0.0010	0.001	F	0.0002	0.0005	0.001	G	0.0010	0.0010	0.005	H	0.0005	0.0005	0.001	J	0.0002	*	0.001	K	0.0005	*	0.001	L	0.0010	*	0.001	M	*	*	0.005	U	*	*	0.005	N	*	*	0.001	<b>F</b>  <b>G</b> 
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<b>D</b>  Diamond	<b>B</b>  5°	*see charts below VALID FOR SHAPES: C, E, H, M, O, P, S, T, R, W	<b>H</b> 																																																																
<b>E</b>  Diamond	<b>C</b>  7°		<b>J</b> 																																																																
<b>H</b>  Hexagon	<b>P</b> 	<table border="1"> <thead> <tr> <th rowspan="2">I.C.</th> <th>A</th> <th>B</th> </tr> <tr> <th>Class</th> <th>Class</th> </tr> </thead> <tbody> <tr> <td>K</td> <td>M</td> <td>N</td> </tr> <tr> <td>L</td> <td>M</td> <td>N</td> </tr> <tr> <td>U</td> <td>M</td> <td>N</td> </tr> </tbody> </table>	I.C.	A	B	Class	Class	K	M	N	L	M	N	U	M	N																																																			
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# Insert Package

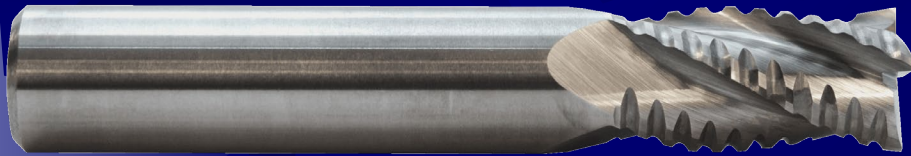


# Additional Tools





# Mill Tooling



Roughing Mill



5 Flute Carbide



2 Flute High Speed  
Steel Ball Mill

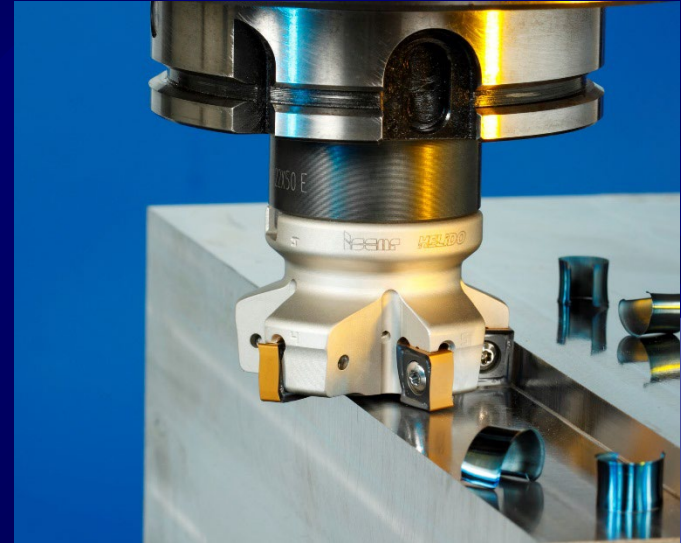


Single Flute H.S.S. End Mill

# Indexible End mills



# Face Mills/Fly Cutters



# Boring Head

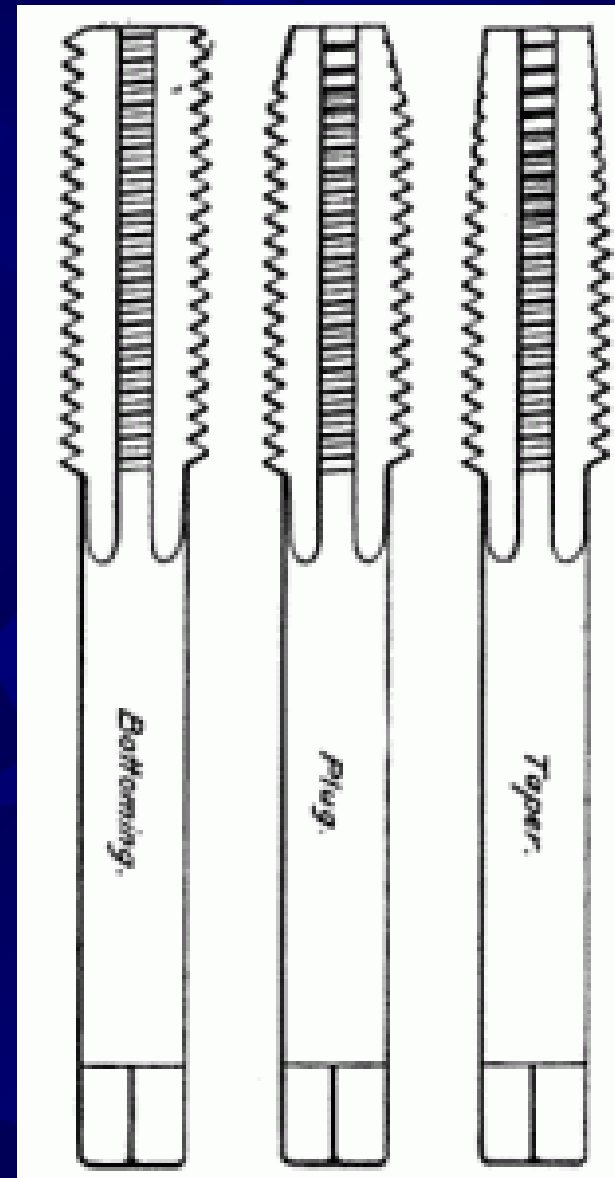


# Drills





# Taps/Threading



# Misc Cutters

