

# Tooling Available

## General Guidelines

- Do no use 2-3 flute endmills on steel
- Do no use ZRN or Other Aluminum coated endmills on steel. AKA if it is coated do not use. Gold is ZRN coated
- Do not use aggressive feeds and speeds. Keep it low and slow until you are 100% sure
- Do not take super light passes and grind away. This is bad for the endmill
- Most of the tools pre-loaded are for aluminum or plastic do not use them for steel. Over time we will add steel tools to the mix. For now please work with the Tormach manager

Tool Library Link (Always double check the tools as they can change on occasion)

<https://a360.co/2KIZJry>

## Tools Loading into Holders

| Tool Number | Description                | Supplier | Model Number | Link for Purchase                                                                                                                                                                                           | Cost                                                                     | Tool Type                          | Stick Out | Feeds and Speeds Details                                                                         | Notes                                          |
|-------------|----------------------------|----------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|------------------------------------|-----------|--------------------------------------------------------------------------------------------------|------------------------------------------------|
| T1          | 2in                        | Tormach  |              | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=38258&amp;portrelay=1">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=38258&amp;portrelay=1</a> |                                                                          | Fly Cutter                         |           | Aluminum 30 ipm /2500 fpm<br><br>Steel do not use this tool on steel as it will break the insert | Set for 2in width of cut approximatly          |
| T2          | .98430                     | Tormach  |              | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=31258&amp;portrelay=1">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=31258&amp;portrelay=1</a> | 155.00<br><br>Inserts are \$22.00 per set and only available in 10 packs | 25mm Center Indexing on Long shaft |           |                                                                                                  | Part number 31258                              |
| T3          | 3/8 Thread Mill            | Tomach   | 34696        | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34696">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34696</a>                                 | 81.95                                                                    | Threadmill                         |           |                                                                                                  | Used for 3/8, 7/16, 1/2, M10, M12, M14 threads |
| T4          | 3/8 Ball Endmill           |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T5          | 3/8 90 Degree Spot Drill   |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T6          | #7 Drill                   |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T7          | 1/4 90 Degree Spot Drill   |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T8          | 1/2 90 Degree Center Drill |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T9          | 17/64 Drill                |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T10         | 1/8 Flat Endmill           |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T11         | 1/8 Ball Endmill           |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T12         | 1/4 Flat Endmill           |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T13         | 7/64 Drill                 |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T14         | 3/8 Flat Long              |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T15         | 3/8 Flat                   |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T16         | #43 Drill                  |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T17         | 1/8 Spot Drill             |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T18         | 3/16 Ball Endmill          |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T19         | 3/16 Flat Endmill          |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T20         | Jacobs Chuck               |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T21         | .1405 Drill                |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T22         | 1/2 Flat Endmill           |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T23         | 1/2 Ball Endmill           |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T24         | #7 Drill                   |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T25         | #17 Drill                  |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T26         | 13/32 Drill                |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |
| T27         | 1/4 Drill                  |          |              |                                                                                                                                                                                                             |                                                                          |                                    |           |                                                                                                  |                                                |

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| T28 | 1/8 Drill      |  |  |  |  |  |  |  |  |
| T29 | #45 Drill      |  |  |  |  |  |  |  |  |
| T30 | #30 Drill      |  |  |  |  |  |  |  |  |
| T31 | #40 Drill      |  |  |  |  |  |  |  |  |
| T32 | #37 Drill      |  |  |  |  |  |  |  |  |
| T33 | #47 Drill      |  |  |  |  |  |  |  |  |
| T34 | 1/8 Slot Mill  |  |  |  |  |  |  |  |  |
| T35 | 3/32 Slot mill |  |  |  |  |  |  |  |  |
| T36 | 1/16 Flat      |  |  |  |  |  |  |  |  |
| T37 |                |  |  |  |  |  |  |  |  |
| T38 |                |  |  |  |  |  |  |  |  |
| T39 |                |  |  |  |  |  |  |  |  |
| T40 |                |  |  |  |  |  |  |  |  |
| T41 |                |  |  |  |  |  |  |  |  |
| T42 |                |  |  |  |  |  |  |  |  |
| T43 |                |  |  |  |  |  |  |  |  |
| T44 |                |  |  |  |  |  |  |  |  |
| T45 |                |  |  |  |  |  |  |  |  |
| T46 |                |  |  |  |  |  |  |  |  |
| T47 |                |  |  |  |  |  |  |  |  |
| T48 |                |  |  |  |  |  |  |  |  |
| T49 |                |  |  |  |  |  |  |  |  |
| T50 | Haimer Probe   |  |  |  |  |  |  |  |  |
| T52 | Tapping Head   |  |  |  |  |  |  |  |  |
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Tool Holder Images

| L to R                                                                                                       | Image |
|--------------------------------------------------------------------------------------------------------------|-------|
| <ul style="list-style-type: none"> <li>• Slot Saw</li> <li>• Empty Slot Saw</li> <li>• Key Cutter</li> </ul> |       |

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- T 6 # 7 D rill
- T 5 3 / 8 9 0 D e g r e e S p o t D rill
- T 4 3 / 8 B a l E n d m i l
- T 3 T h r e a d M i l l
- T 2 2 5 m m C e n t e r C u t E n d m i l l
- T 1 S u p e r f y





- T 1 2 1 / 4 Flat End mill
- T 1 1 1 / 8 Ball End mill
- T 1 0 1 / 8 Flat End mill
- T 9 1 7 / 6 4 Drill
- T 8 1 / 2 6 0 degree Center Drill



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- T 1 8 3 / 1 6 B all
- T 1 7 1 / 8 9 0 D e g r e e s p o t d rill
- T 1 6 # 4 3 D rill
- T 1 5 3 / 8 F lat
- T 1 4 3 / 8 F la t L o n g
- T 1 3 7 / 6 4 D rill



- T 2 4 # 7 D rill

- T231 / 2 Ball Long T221 / 2 Flat Long
- T21.1405 Drill
- T20 Jacobs Chuck (Dynamic based upon drill used)



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| <ul style="list-style-type: none"> <li>• T 3 3 # 4 7 D rill</li> <li>• T 3 2 # 3 7 D rill</li> <li>• T 3 1 # 4 0 D rill</li> </ul> |   |
| <ul style="list-style-type: none"> <li>• T 3 6 1 / 1 6 F lat</li> <li>• S m a l l J a c o b s C h u c k</li> </ul>                 |  |

Spares/Inventory

| Tool Number | Size        | Quantity | Supplier | Model Number | Link for Purchase                                                                                                                                                           | Cost          | Tool Type | Notes |
|-------------|-------------|----------|----------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------|-------|
|             | 17/64 Drill | 10       | Tormach  | 33583        | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=33583">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=33583</a> | 263.00 per 10 | Drill     |       |

|  |                            |    |                |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |         |                                                                                                                                                                                                                   |
|--|----------------------------|----|----------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 1/4 Drill                  | 10 | Tormach        | 33582                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=33582">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=33582</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 230.00<br>per 10   | Drill   |                                                                                                                                                                                                                   |
|  | 13/32 Drill                | 5  | Tormach        | 33602                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=33602">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=33602</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 38.00<br>Per 5     | Drill   |                                                                                                                                                                                                                   |
|  | #7 Drill                   | 10 | Tormach        | 34507                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34507">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34507</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 153.00<br>Per 10   | Drill   |                                                                                                                                                                                                                   |
|  | 1/8 Drill                  | 10 | Tormach        | 33574                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=33574">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=33574</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 131.00<br>Per 10   | Drill   |                                                                                                                                                                                                                   |
|  | #43 Drill                  | 10 | Tormach        | 34543                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34543">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34543</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 98.00<br>Per 10    | Drill   |                                                                                                                                                                                                                   |
|  | #16 Drill                  | 10 | Tormach        | 34516                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34516">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34516</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 142.00<br>Per 10   | Drill   |                                                                                                                                                                                                                   |
|  | #17 Drill                  | 10 | Tormach        | 34517                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34517">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34517</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 142.00<br>Per 10   | Drill   |                                                                                                                                                                                                                   |
|  | #45 Drill                  | 10 | Tormach        | 34545                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34545">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34545</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 98 Per<br>10       | Drill   |                                                                                                                                                                                                                   |
|  | #46 Drill                  | 10 | Tormach        | 34546                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34546">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34546</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 98 Per<br>10       | Drill   |                                                                                                                                                                                                                   |
|  | #40 Drill                  | 10 | Tormach        | 34540                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34540">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34540</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 98 Per<br>10       | Drill   |                                                                                                                                                                                                                   |
|  | #37 Drill                  | 10 | Tormach        | 34537                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34537">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34537</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 98 Per<br>10       | Drill   |                                                                                                                                                                                                                   |
|  | #31 Drill                  | 10 | Tormach        | 34531                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34531">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34531</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 98 Per<br>10       | Drill   |                                                                                                                                                                                                                   |
|  | #30 Drill                  | 10 | Tormach        | 34530                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34530">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34530</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 98 Per<br>10       | Drill   |                                                                                                                                                                                                                   |
|  | #29 Drill                  | 10 | Tormach        | 34529                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34529">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34529</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 98 Per<br>10       | Drill   |                                                                                                                                                                                                                   |
|  |                            |    |                |                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                    |         |                                                                                                                                                                                                                   |
|  | 1/16 2 flute Flat          | 1  | Kodiak         | 5463480<br>B007BTQK<br>gi | <a href="https://www.kodiakcuttingtools.com/viewproducts/carbide-end-mills-2-flute-single-end-ticn-coated&amp;parttohighlight=5463480">https://www.kodiakcuttingtools.com/viewproducts/carbide-end-mills-2-flute-single-end-ticn-coated&amp;parttohighlight=5463480</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 8.90               | Endmill | <a href="https://www.kodiakcuttingtools.com/CarbideEndMillSpeedsAndFeeds">https://www.kodiakcuttingtools.com/CarbideEndMillSpeedsAndFeeds</a>                                                                     |
|  | 1/8 4 Flute HSS            | 1  | YG1            | 07039                     | <a href="http://www.yg1usa.com/feature/itemdetail.asp?edpno=07039">http://www.yg1usa.com/feature/itemdetail.asp?edpno=07039</a><br><a href="https://apexindustrialsupply.com/yg1-usa-edp-07039-4-flute-regular-length-center-cut-hss-1-8-x-3-8-x-3-8-x-2-5-16/">https://apexindustrialsupply.com/yg1-usa-edp-07039-4-flute-regular-length-center-cut-hss-1-8-x-3-8-x-3-8-x-2-5-16/</a>                                                                                                                                                                                                                                                                                                                                              | 8.37               | Endmill | <a href="http://www.yg1usa.com/feature/speed_data.asp?img=brown_mill/141&amp;name=TECHNICAL%20DATA">http://www.yg1usa.com/feature/speed_data.asp?img=brown_mill/141&amp;name=TECHNICAL%20DATA</a>                 |
|  | 5/16 4 Flute HSS           | 1  | YG1            | 07051                     | <a href="http://www.yg1usa.com/feature/itemdetail.asp?edpno=07051">http://www.yg1usa.com/feature/itemdetail.asp?edpno=07051</a><br><a href="https://apexindustrialsupply.com/yg1-usa-edp-07051-4-flute-regular-length-center-cut-hss-5-16-x-3-8-x-3-4-x-2-1-2/">https://apexindustrialsupply.com/yg1-usa-edp-07051-4-flute-regular-length-center-cut-hss-5-16-x-3-8-x-3-4-x-2-1-2/</a>                                                                                                                                                                                                                                                                                                                                              | 8.37               | Endmill | <a href="http://www.yg1usa.com/feature/speed_data.asp?img=brown_mill/141&amp;name=TECHNICAL%20DATA">http://www.yg1usa.com/feature/speed_data.asp?img=brown_mill/141&amp;name=TECHNICAL%20DATA</a>                 |
|  | 3/16 4 flute HSS           | 1  | YG1            | 07043                     | <a href="http://www.yg1usa.com/feature/itemdetail.asp?edpno=07043">http://www.yg1usa.com/feature/itemdetail.asp?edpno=07043</a><br><a href="https://apexindustrialsupply.com/yg1-usa-edp-07043-4-flute-regular-length-center-cut-hss-3-16-x-3-8-x-1-2-x-2-3-8/">https://apexindustrialsupply.com/yg1-usa-edp-07043-4-flute-regular-length-center-cut-hss-3-16-x-3-8-x-1-2-x-2-3-8/</a>                                                                                                                                                                                                                                                                                                                                              | 8.37               | Endmill | <a href="http://www.yg1usa.com/feature/speed_data.asp?img=brown_mill/141&amp;name=TECHNICAL%20DATA">http://www.yg1usa.com/feature/speed_data.asp?img=brown_mill/141&amp;name=TECHNICAL%20DATA</a>                 |
|  | 5/16 2 flute HSS           | 1  | YG1            | 01051                     | <a href="https://apexindustrialsupply.com/yg1-usa-edp-01051-2-flute-regular-length-se-hss-5-16-x-3-8-x-9-16-x-2-5-16/">https://apexindustrialsupply.com/yg1-usa-edp-01051-2-flute-regular-length-se-hss-5-16-x-3-8-x-9-16-x-2-5-16/</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 7.57               | Endmill |                                                                                                                                                                                                                   |
|  | 1/4 2 flute HSS            | 1  | YG1            | 01047                     | <a href="https://apexindustrialsupply.com/yg1-usa-edp-01047-2-flute-regular-length-se-hss-1-4-x-3-8-x-1-2-x-2-5-16/">https://apexindustrialsupply.com/yg1-usa-edp-01047-2-flute-regular-length-se-hss-1-4-x-3-8-x-1-2-x-2-5-16/</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 7.57               | Endmill |                                                                                                                                                                                                                   |
|  | 1/8 2 Flute Carbide (TICN) | 3  | Tormach<br>YG1 | 33439                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=33439">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=33439</a><br><br>Same part<br><a href="http://www.yg1usa.com/feature/itemdetail.asp?edpno=21601TC">http://www.yg1usa.com/feature/itemdetail.asp?edpno=21601TC</a><br><br>Same Part Cheaper<br><a href="https://apexindustrialsupply.com/yg1-usa-edp-21601tc-2-flute-regular-length-42-deg-helix-straight-shank-ticn-coated-carbide-for-aluminum-banshee-1-8-x-1-4-x-5-16-x-1-3-4/">https://apexindustrialsupply.com/yg1-usa-edp-21601tc-2-flute-regular-length-42-deg-helix-straight-shank-ticn-coated-carbide-for-aluminum-banshee-1-8-x-1-4-x-5-16-x-1-3-4/</a> | 25.25<br><br>19.75 | Endmill | <a href="http://www.yg1usa.com/feature/speed_data.asp?img=blue_mill/116&amp;name=SPEED%20and%20FEED%20DATA">http://www.yg1usa.com/feature/speed_data.asp?img=blue_mill/116&amp;name=SPEED%20and%20FEED%20DATA</a> |
|  | 3/16 2 flute TIAIN Coated  | 2  | Tormach<br>YG1 | 33741                     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=33741">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=33741</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 12.05              | Endmill | <a href="http://www.yg1usa.com/feature/speed_data.asp?img=blue_mill/116&amp;name=SPEED%20and%20FEED%20DATA">http://www.yg1usa.com/feature/speed_data.asp?img=blue_mill/116&amp;name=SPEED%20and%20FEED%20DATA</a> |

|  |                                                  |   |                    |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |         |                                                                                                                                                                                                                   |
|--|--------------------------------------------------|---|--------------------|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | 1/16 2 Flute<br>TICN                             | 1 | Tormach<br><br>YG1 | 33434<br><br>21554TC | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=33434">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=33434</a><br><br><a href="http://www.yg1usa.com/feature/itemdetail.asp?edpno=21554TC">http://www.yg1usa.com/feature/itemdetail.asp?edpno=21554TC</a><br><br><a href="https://apexindustrialsupply.com/yg1-usa-edp-21566tc-2-flute-regular-length-42-deg-helix-straight-shank-ticn-coated-carbide-for-aluminum-banshee-3-16-x-1-4-x-7-16-x-2/">https://apexindustrialsupply.com/yg1-usa-edp-21566tc-2-flute-regular-length-42-deg-helix-straight-shank-ticn-coated-carbide-for-aluminum-banshee-3-16-x-1-4-x-7-16-x-2/</a> | 25.25  | Endmill | <a href="http://www.yg1usa.com/feature/speed_data.asp?img=blue_mill/116&amp;name=SPEED%20and%20FEED%20DATA">http://www.yg1usa.com/feature/speed_data.asp?img=blue_mill/116&amp;name=SPEED%20and%20FEED%20DATA</a> |
|  | 1/2 2 flute ZRN<br>Coating<br>Extended<br>Length | 1 | Lakeshore          | 350012LXRF           | <a href="http://www.lakeshorecarbide.com/12extendedlengthrougherfinisher2flutevariablefluteendmillforaluminumzrn.aspx">http://www.lakeshorecarbide.com/12extendedlengthrougherfinisher2flutevariablefluteendmillforaluminumzrn.aspx</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 80.94  | Endmill | <a href="http://www.lakeshorecarbide.com/lakeshorevariablespeedandfeedforaluminum.aspx">http://www.lakeshorecarbide.com/lakeshorevariablespeedandfeedforaluminum.aspx</a>                                         |
|  | 3/8 3 flute ZRN<br>Extended<br>Length            | 1 | Lakeshore          | 360038X-XL           | <a href="https://www.lakeshorecarbide.com/38xtralonglengthvariablefluteendmillforaluminumzrn.aspx">https://www.lakeshorecarbide.com/38xtralonglengthvariablefluteendmillforaluminumzrn.aspx</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 71.99  | Endmill | <a href="http://www.lakeshorecarbide.com/pdf/VFA.pdf">http://www.lakeshorecarbide.com/pdf/VFA.pdf</a>                                                                                                             |
|  | 3/8 2 Flute<br>ZRN Coated                        | 2 | Lakeshore          | 320038XRF            | <a href="http://www.lakeshorecarbide.com/38rougherfinishersquareendvariable2fluteendmillforaluminumzrn.aspx">http://www.lakeshorecarbide.com/38rougherfinishersquareendvariable2fluteendmillforaluminumzrn.aspx</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 41.50  | Endmill | <a href="http://www.lakeshorecarbide.com/pdf/VFA.pdf">http://www.lakeshorecarbide.com/pdf/VFA.pdf</a>                                                                                                             |
|  | 1/4 3 flute ZRN<br>Coated                        | 2 | Lakeshore          | 330014XRF            | <a href="http://www.lakeshorecarbide.com/14rougherfinishersquareendvariable3fluteendmillforaluminumzrn.aspx">http://www.lakeshorecarbide.com/14rougherfinishersquareendvariable3fluteendmillforaluminumzrn.aspx</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 28.55  | Endmill | <a href="http://www.lakeshorecarbide.com/pdf/VFA.pdf">http://www.lakeshorecarbide.com/pdf/VFA.pdf</a>                                                                                                             |
|  | 3/16 2 Flute<br>Ball ZRN<br>Coated               | 1 | Lakeshore          | 340316XRF            | <a href="http://www.lakeshorecarbide.com/316rougherfinishervariablefluteballendmillforaluminumzrn.aspx">http://www.lakeshorecarbide.com/316rougherfinishervariablefluteballendmillforaluminumzrn.aspx</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 30.27  | Endmill | <a href="http://www.lakeshorecarbide.com/pdf/VFA.pdf">http://www.lakeshorecarbide.com/pdf/VFA.pdf</a>                                                                                                             |
|  | 1/8 2 flute ball<br>ZRN Coated                   | 1 | Lakeshore          | 340018XRF            | <a href="http://www.lakeshorecarbide.com/18rougherfinishervariablefluteballendmillforaluminumzrn.aspx">http://www.lakeshorecarbide.com/18rougherfinishervariablefluteballendmillforaluminumzrn.aspx</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 24.29  | Endmill | <a href="http://www.lakeshorecarbide.com/pdf/VFA.pdf">http://www.lakeshorecarbide.com/pdf/VFA.pdf</a>                                                                                                             |
|  | 1/8 2 Flute Flat<br>ZRN Coated                   | 5 | Lakeshore          | 350018XRF            | <a href="https://www.lakeshorecarbide.com/18rougherfinishervariable2fluteendmillforaluminumzrn.aspx">https://www.lakeshorecarbide.com/18rougherfinishervariable2fluteendmillforaluminumzrn.aspx</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 16.47  | Endmill |                                                                                                                                                                                                                   |
|  | 1/16 2flute Flat                                 | 3 | Lakeshore          | LC204-001020         | <a href="https://www.lakeshorecarbide.com/116dia2flutereglengthendmilluncoated.aspx">https://www.lakeshorecarbide.com/116dia2flutereglengthendmilluncoated.aspx</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 5.94   | Endmill |                                                                                                                                                                                                                   |
|  | 1/16 2 flute Ball<br>TIALN                       | 1 | Lakeshore          | LC219-001023         | <a href="http://www.lakeshorecarbide.com/116stubcarbideballendmill2flutetialncoated.aspx">http://www.lakeshorecarbide.com/116stubcarbideballendmill2flutetialncoated.aspx</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 9.95   | Endmill |                                                                                                                                                                                                                   |
|  | 1/8 2 flute                                      | 1 | Onsrud             | AMC400002            | <a href="https://www.onsrud.com/Products/AMC400002.asp">https://www.onsrud.com/Products/AMC400002.asp</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 18.95  | Endmill |                                                                                                                                                                                                                   |
|  | 3/16 2 flute                                     | 1 | Onsrud             | AMC400008            | <a href="https://www.onsrud.com/Products/AMC400008.asp">https://www.onsrud.com/Products/AMC400008.asp</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 25.95  | Endmill |                                                                                                                                                                                                                   |
|  | 1/4 2 flute<br>medium length                     | 2 | Onsrud             | AMC700752            | <a href="https://www.onsrud.com/Products/AMC700752.asp">https://www.onsrud.com/Products/AMC700752.asp</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 34.45  | Endmill |                                                                                                                                                                                                                   |
|  | 1/4 2 flute<br>Standard length                   | 2 | Onsrud             | AMC700102            | <a href="https://www.onsrud.com/Products/AMC700102.asp">https://www.onsrud.com/Products/AMC700102.asp</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 30.90  | Endmill |                                                                                                                                                                                                                   |
|  | 3/8 2 flute<br>medium length                     | 1 | Onsrud             | AMC700852            | <a href="https://www.onsrud.com/Products/AMC700852.asp">https://www.onsrud.com/Products/AMC700852.asp</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 49.35  | Endmill |                                                                                                                                                                                                                   |
|  | 1/2 2 flute                                      | 1 | Onsrud             | AMC700952            | <a href="https://www.onsrud.com/Products/AMC700952.asp">https://www.onsrud.com/Products/AMC700952.asp</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 72.45  | Endmill |                                                                                                                                                                                                                   |
|  | #29 Carbide<br>Jobber Drill                      | 1 | Ultratools         | 51129                | <a href="https://www.ultra-tool.com/products/">https://www.ultra-tool.com/products/</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 13.30  | Endmill |                                                                                                                                                                                                                   |
|  | 1/4 90 Degree<br>Spot Drill                      | 1 | Ultratools         | 52516                | <a href="https://www.ultra-tool.com/products/">https://www.ultra-tool.com/products/</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 16.20  | Endmill |                                                                                                                                                                                                                   |
|  | 21/32 4 flute<br>HSS Endmill                     | 1 | Niagara            | MC40213              | Old Product                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |        | Endmill |                                                                                                                                                                                                                   |
|  | 41/64 4 flute<br>HSS Endmill                     | 1 | Niagara            | MC40209              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        | Endmill |                                                                                                                                                                                                                   |
|  | 3/8 HSS 4 flute                                  | 1 | Niagara            | EDP<br>N52264        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        | Endmill |                                                                                                                                                                                                                   |
|  | 1/2 HSS 4 flute                                  | 1 | Niagara            | EDP<br>N52268        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        | Endmill |                                                                                                                                                                                                                   |
|  | 3/8 4 flute long                                 | 1 | Niagara            | EDP<br>N63342        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        | Endmill |                                                                                                                                                                                                                   |
|  | 1/4 4 flute HSS                                  | 1 | Shars              | 404-9395             | <a href="https://www.shars.com/1-4-x-3-8-m-42-cobalt-4-flute-double-end-mill-1">https://www.shars.com/1-4-x-3-8-m-42-cobalt-4-flute-double-end-mill-1</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 8.00   | Endmill |                                                                                                                                                                                                                   |
|  | 1/16 woodruff<br>Keyseat Cutter                  | 1 | Whitney            | 302040               | <a href="https://www.whitneytool.com/PDF/WhitneyCatalog.pdf">https://www.whitneytool.com/PDF/WhitneyCatalog.pdf</a><br><br><a href="https://www.whitneytool.com/Product.aspx?ID=8544">https://www.whitneytool.com/Product.aspx?ID=8544</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                  |        | Endmill |                                                                                                                                                                                                                   |
|  | #37 Reamer                                       | 1 | Morse              | 5661                 | <a href="https://www.morsecuttingtools.com/catalogue/product/1213060">https://www.morsecuttingtools.com/catalogue/product/1213060</a><br><br><a href="https://www.motionindustries.com/productDetail.jsp?sku=06923027">https://www.motionindustries.com/productDetail.jsp?sku=06923027</a>                                                                                                                                                                                                                                                                                                                                                                                                  | 34.42  | Endmill |                                                                                                                                                                                                                   |
|  | 3" x 3/32" X<br>30T Slot Mill                    | 1 | Tormach            | 34988                | <a href="https://tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34988">https://tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34988</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 96.00  | Endmill |                                                                                                                                                                                                                   |
|  | 3" X 1/8 X 30T<br>Slot                           | 1 | Tormach            | 34989                | <a href="https://tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34989">https://tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34989</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 113.00 | Endmill |                                                                                                                                                                                                                   |
|  |                                                  |   |                    |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |         |                                                                                                                                                                                                                   |



|  |                          |   |                              |           |                                                                                                                                                                                                                                                                                                                                                          |       |              |                   |
|--|--------------------------|---|------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------|-------------------|
|  | 1/4 20 4 flute long plug | 1 | Granger                      | 008862AS  | <a href="https://www.grainger.com/product/REGAL-1-4-20-39TA77">https://www.grainger.com/product/REGAL-1-4-20-39TA77</a>                                                                                                                                                                                                                                  | 29.35 | Imperial Tap |                   |
|  | 2-56 Plug                | 2 | OSG                          | 2492800   | <a href="http://www.osgtool.com/Product-Detail/HYPRO-DC-Taps/2492800">http://www.osgtool.com/Product-Detail/HYPRO-DC-Taps/2492800</a>                                                                                                                                                                                                                    | 25.80 | Imperial Tap |                   |
|  | 2-56 Bottom              | 2 | OSG                          | 2492900   | <a href="http://www.osgtool.com/Product-Detail/HYPRO-DC-Taps/2492900">http://www.osgtool.com/Product-Detail/HYPRO-DC-Taps/2492900</a>                                                                                                                                                                                                                    | 25.80 | Imperial Tap |                   |
|  | 0/80 Tap                 | 2 | Widia /Granger               | 13202     | <a href="https://www.widia.com/en/products/44931668/557905/25758765/26261949/100007411.html?orderNumber=2750249">https://www.widia.com/en/products/44931668/557905/25758765/26261949/100007411.html?orderNumber=2750249</a><br><a href="https://www.grainger.com/product/WIDIA-GTD-0-80-4CPH9">https://www.grainger.com/product/WIDIA-GTD-0-80-4CPH9</a> | 15.40 | Imperial Tap |                   |
|  | 12-32 Tap                | 1 | Unknown                      |           | <a href="http://www.northbaycuttingtools.com/12-32-gh3-high-speed-steel-4-flute-bottom-tap-12121232">http://www.northbaycuttingtools.com/12-32-gh3-high-speed-steel-4-flute-bottom-tap-12121232</a>                                                                                                                                                      | 8.99  | Imperial Tap |                   |
|  | 8-32 Tap                 | 2 | Greenfeild Tap & Die Tormach | 34567     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34567&amp;portrelay=1">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34567&amp;portrelay=1</a>                                                                                                                                              | 7.65  | Imperial Tap |                   |
|  | 6-32 Tap                 | 3 | OSG                          | 2401603   | <a href="http://www.osgtool.com/Product-Detail/HYPRO-DC-Taps/2401603">http://www.osgtool.com/Product-Detail/HYPRO-DC-Taps/2401603</a>                                                                                                                                                                                                                    | 14.12 | Imperial Tap |                   |
|  | 10-32 Tap                | 1 | YG1 Tormach                  | I9343     | <a href="http://www.yg1usa.com/feature/itemdetail.asp?edpno=I9343">http://www.yg1usa.com/feature/itemdetail.asp?edpno=I9343</a><br><a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34569&amp;portrelay=1">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34569&amp;portrelay=1</a>           | 7.65  | Imperial Tap |                   |
|  | 1/4-20 Tap               | 1 | YG1 Tormach                  | I9403     | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34570&amp;portrelay=1">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=34570&amp;portrelay=1</a>                                                                                                                                              | 7.65  | Imperial Tap |                   |
|  |                          |   |                              |           |                                                                                                                                                                                                                                                                                                                                                          |       |              |                   |
|  | M2.5 X 0.45              | 3 | Greenfeild                   | 328174    | <a href="https://www.amazon.com/Greenfield-Threading-328174-M2-5-Bottom/dp/B0196606KC">https://www.amazon.com/Greenfield-Threading-328174-M2-5-Bottom/dp/B0196606KC</a>                                                                                                                                                                                  | 9.04  | Metric Tap   |                   |
|  | M2.5 X 0.45              | 2 | Helicoil                     | 2087-2.5  | <a href="https://www.motionindustries.com/productDetail.jsp?sku=01549979">https://www.motionindustries.com/productDetail.jsp?sku=01549979</a>                                                                                                                                                                                                            | 29.91 | Metric Tap   |                   |
|  | M2.5 X 0.45              | 1 | Helicoil                     | 2093-2.5  | <a href="https://www.motionindustries.com/productDetail.jsp?sku=01549996">https://www.motionindustries.com/productDetail.jsp?sku=01549996</a>                                                                                                                                                                                                            | 32.60 | Metric Tap   |                   |
|  | M3                       | 1 | Kodiak                       | KTC210846 | <a href="https://www.amazon.com/Kodiak-Cutting-Tools-KCT210846-Threads/dp/B007BTQ9IU?ref_=fscpl_dp_dp_4">https://www.amazon.com/Kodiak-Cutting-Tools-KCT210846-Threads/dp/B007BTQ9IU?ref_=fscpl_dp_dp_4</a>                                                                                                                                              | 13.29 | Metric Tap   |                   |
|  | M12 X 1.5                | 2 | National                     |           | <a href="https://www.amazon.com/CHANNELLOCK-8343-12mm-1-5-Metric/dp/B0002JT0Z0">https://www.amazon.com/CHANNELLOCK-8343-12mm-1-5-Metric/dp/B0002JT0Z0</a>                                                                                                                                                                                                | 8.81  | Metric Tap   |                   |
|  | M15.2 X 1.41 Pipe Tap    | 1 |                              |           |                                                                                                                                                                                                                                                                                                                                                          |       |              | Really unique Tap |
|  | M18.6 X 1.41 Pip Tap     | 1 |                              |           |                                                                                                                                                                                                                                                                                                                                                          |       |              | Really unique Tap |
|  |                          |   |                              |           |                                                                                                                                                                                                                                                                                                                                                          |       |              |                   |

#### Tools used for the Turners Cube Class

| Tool Number | Size | Supplier  | Model Number | Link for Purchase                                                                                                                                                                                                     | Tool Type | Stick Out | Feeds and Speeds Details                                                                              | Notes                                |
|-------------|------|-----------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|-------------------------------------------------------------------------------------------------------|--------------------------------------|
| T1 Superfly | 2 in | Tormach   |              | <a href="https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=38258&amp;portrelay=1">https://www.tormach.com/store/index.php?app=ecom&amp;ns=prodshow&amp;ref=38258&amp;portrelay=1</a>           |           |           | Aluminum 30 ipm/2500 fpm<br>Steel do not use this tool on steel as it will break the insert           | Set for 2in width of cut appoximatly |
| 3/8 Rougher | 3/8  | Lakeshore | 320038XRF    | <a href="http://www.lakeshorecarbide.com/38rougherfinishersquareendvariable2fluteendmillforaluminu mzn.aspx">http://www.lakeshorecarbide.com/38rougherfinishersquareendvariable2fluteendmillforaluminu mzn.aspx</a>   |           |           | <a href="http://www.lakeshorecarbide.com/pdf/VFA.pdf">http://www.lakeshorecarbide.com/pdf/VFA.pdf</a> |                                      |
| 1/4         | 1/4  | Lakeshore | 330014XRF    | <a href="https://www.lakeshorecarbide.com/14rougherfinishersquareendvariable3fluteendmillforaluminu mzn.aspx">https://www.lakeshorecarbide.com/14rougherfinishersquareendvariable3fluteendmillforaluminu mzn.aspx</a> |           |           | <a href="http://www.lakeshorecarbide.com/pdf/VFA.pdf">http://www.lakeshorecarbide.com/pdf/VFA.pdf</a> |                                      |