# FORCE4

Making it easy to machine difficult materials

AEROSPACE

AUTOMOTIVE

ENERGY

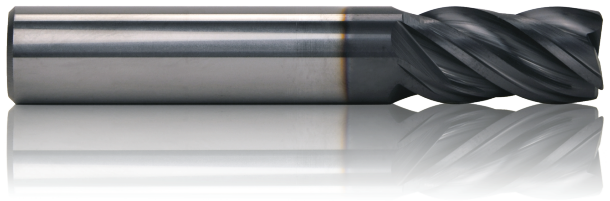
MEDICAL

Increased stock removal rates • Chatter resistant by design
Improved surface finish and extended tool life • Variable helix
Unequal index • Standard with corner radius

# 5AXIS GRINDING, INC.

86 West Park Road Dayton, OH 45459 937.312.9797 937.312.9798 www.5axisgrinding.com

# FORCE4



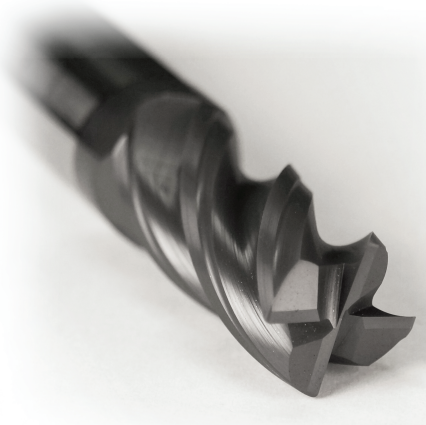
## Material Guide

| Steel | | Hard Steel | Stainless Steel | | | Cast Iron | | Hi-Temp Alloys | |
|---|---|---|---|---|---|---|---|---|---|
| A2 H13<br>A3 M1<br>D2 O-1<br>H11 S-7<br>NAK 55 | P20<br>P21<br>S-136<br>PX5<br>NAK 80 | Steel Grades >50Rc. | 410 430F<br>416 440C<br>420 | 303 320<br>304 304L<br>316 316L<br>321 347<br>Kovar<br>Invar 36 | 320<br>304L<br>316L | Grey<br>GG-10<br>GG-15<br>GG-20/25<br>GG-30/35<br>GG-40 | Ductile (Nodular)<br>Malleable<br>GGG-40<br>GGG-50<br>GGG-60<br>GGG-70 | Inconel 718<br>Rene 100<br>A286<br>Waspalloy<br>Hastalloy<br>Mar-M<br>AirResist | Inconel 600<br>Rene 41<br>Haynes<br>H-188<br>Hast-X<br>Stellite<br>Monel |

*Surface Feet per Minute (SFM)*

| | | *low-high* | *low-high* | *low-high* | *low-high* | *low-high* | *low-high* | *low-high* | *low-high* | *low-high* |
|---|---|---|---|---|---|---|---|---|---|---|
| SFM | <42 Rc<br>≥42 Rc | 200-300<br>110-150 | 200-300<br>110-140 | 90-140 | 200-300<br>110-175 | 160-300<br>110-160 | 130-250<br>90-130 | 300-450<br>170-220 | 200-320<br>90-180 | 70-110<br>60-80 |
| 1/8 | *Slot* | .0005-.0006 | .0004-.0006 | .0004-.0006 | .0005-.0007 | .0005-.0006 | .0004-.0006 | .0006-.0008 | .0005-.0007 | .0003-.0004 |
| | *HR* | .0006-.0008 | .0005-.0007 | .0005-.0007 | .0006-.0009 | .0006-.0008 | .0005-.0007 | .0007-.0010 | .0006-.0008 | .0003-.0005 |
| | *LR* | .0007-.0010 | .0007-.0009 | .0006-.0009 | .0008-.0011 | .0007-.0010 | .0007-.0009 | .0009-.0013 | .0008-.0010 | .0004-.0006 |
| | *Finish* | .0005-.0007 | .0005-.0006 | .0004-.0006 | .0006-.0008 | .0005-.0007 | .0005-.0006 | .0007-.0009 | .0005-.0007 | .0003-.0004 |
| 1/4 | *Slot* | .0010-.0013 | .0009-.0012 | .0008-.0011 | .0010-.0014 | .0010-.0013 | .0009-.0012 | .0012-.0016 | .0010-.0013 | .0005-.0007 |
| | *HR* | .0012-.0016 | .0011-.0014 | .0010-.0014 | .0013-.0017 | .0012-.0016 | .0011-.0014 | .0015-.0020 | .0012-.0017 | .0007-.0009 |
| | *LR* | .0015-.0020 | .0013-.0018 | .0013-.0017 | .0016-.0022 | .0015-.0020 | .0013-.0018 | .0019-.0025 | .0015-.0021 | .0009-.0012 |
| | *Finish* | .0010-.0014 | .0009-.0013 | .0009-.0012 | .0011-.0015 | .0010-.0014 | .0009-.0013 | .0013-.0018 | .0011-.0015 | .0006-.0008 |
| 3/8 | *Slot* | .0014-.0019 | .0013-.0017 | .0012-.0017 | .0015-.0021 | .0014-.0019 | .0013-.0017 | .0018-.0024 | .0015-.0020 | .0008-.0011 |
| | *HR* | .0018-.0024 | .0016-.0022 | .0015-.0021 | .0019-.0026 | .0018-.0024 | .0016-.0022 | .0022-.0030 | .0018-.0025 | .0010-.0014 |
| | *LR* | .0022-.0030 | .0020-.0027 | .0019-.0026 | .0024-.0032 | .0022-.0030 | .0020-.0027 | .0028-.0038 | .0023-.0031 | .0013-.0017 |
| | *Finish* | .0016-.0021 | .0014-.0019 | .0013-.0018 | .0017-.0023 | .0016-.0021 | .0014-.0019 | .0020-.0027 | .0016-.0022 | .0009-.0012 |
| 1/2 | *Slot* | .0019-.0026 | .0017-.0023 | .0016-.0022 | .0020-.0028 | .0019-.0026 | .0017-.0023 | .0024-.0032 | .0020-.0027 | .0011-.0015 |
| | *HR* | .0024-.0032 | .0021-.0029 | .0020-.0028 | .0026-.0035 | .0024-.0032 | .0021-.0029 | .0030-.0040 | .0025-.0033 | .0014-.0018 |
| | *LR* | .0030-.0040 | .0027-.0036 | .0026-.0035 | .0032-.0043 | .0030-.0040 | .0027-.0036 | .0037-.0050 | .0031-.0042 | .0017-.0023 |
| | *Finish* | .0021-.0028 | .0019-.0025 | .0018-.0024 | .0022-.0030 | .0021-.0028 | .0019-.0025 | .0026-.0035 | .0022-.0029 | .0012-.0016 |
| 5/8 | *Slot* | .0024-.0032 | .0021-.0029 | .0020-.0028 | .0026-.0035 | .0024-.0032 | .0021-.0029 | .0030-.0040 | .0025-.0033 | .0014-.0018 |
| | *HR* | .0030-.0040 | .0027-.0036 | .0026-.0035 | .0032-.0043 | .0030-.0040 | .0027-.0036 | .0037-.0050 | .0031-.0042 | .0017-.0023 |
| | *LR* | .0037-.0050 | .0033-.0045 | .0032-.0043 | .0040-.0054 | .0037-.0050 | .0033-.0045 | .0046-.0063 | .0039-.0052 | .0021-.0029 |
| | *Finish* | .0026-.0035 | .0023-.0032 | .0022-.0030 | .0028-.0038 | .0026-.0035 | .0023-.0032 | .0033-.0044 | .0027-.0037 | .0015-.0020 |
| 3/4 | *Slot* | .0029-.0039 | .0026-.0035 | .0024-.0033 | .0031-.0041 | .0029-.0039 | .0026-.0035 | .0036-.0048 | .0030-.0040 | .0016-.0022 |
| | *HR* | .0036-.0048 | .0032-.0043 | .0031-.0041 | .0038-.0052 | .0036-.0048 | .0032-.0043 | .0045-.0060 | .0037-.0050 | .0020-.0028 |
| | *LR* | .0045-.0060 | .0040-.0054 | .0038-.0052 | .0048-.0065 | .0045-.0060 | .0040-.0054 | .0056-.0075 | .0046-.0063 | .0026-.0035 |
| | *Finish* | .0031-.0043 | .0028-.0038 | .0027-.0036 | .0034-.0046 | .0031-.0043 | .0028-.0038 | .0039-.0053 | .0033-.0044 | .0018-.0024 |
| 1 | *Slot* | .0038-.0052 | .0034-.0046 | .0033-.0044 | .0041-.0055 | .0038-.0052 | .0034-.0046 | .0048-.0064 | .0039-.0053 | .0022-.0029 |
| | *HR* | .0048-.0064 | .0043-.0058 | .0041-.0055 | .0051-.0069 | .0048-.0064 | .0043-.0058 | .0060-.0081 | .0049-.0067 | .0027-.0037 |
| | *LR* | .0060-.0081 | .0053-.0072 | .0051-.0069 | .0064-.0086 | .0060-.0081 | .0053-.0072 | .0074-.0101 | .0062-.0083 | .0034-.0046 |
| | *Finish* | .0042-.0057 | .0037-.0051 | .0036-.0049 | .0045-.0061 | .0042-.0057 | .0037-.0051 | .0052-.0071 | .0043-.0059 | .0024-.0032 |

| Dia. | L.O.C. | O.A.L. | Part # |
|---|---|---|---|
| 1/8” | 1/2” | 1-1/2” | 40125R |
| 3/16” | 5/8” | 2” | 40187R |
| 1/4” | 3/4” | 2-1/2” | 40250R |
| 5/16” | 13/16” | 2-1/2” | 40312R |
| 3/8” | 7/8” | 2-1/2” | 40375R |
| 1/2” | 1-1/4” | 3” | 40500R |
| 5/8” | 1-1/2” | 3-1/2” | 40625R |
| 3/4” | 1-5/8” | 4” | 40750R |
| 1” | 1-3/4” | 4” | 41000R |



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