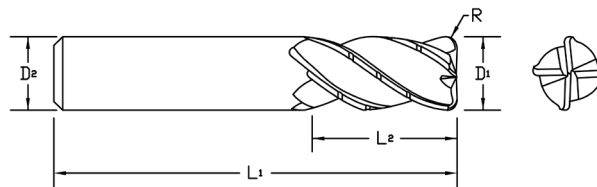
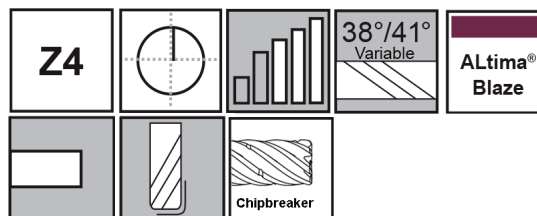


# TuffCut® XT Series 277CB



- Staggered chipbreaker technology.
- Enhanced corner protection.
- Variable helix.

**For quick delivery on non-stocked sizes, request Rapid Turn Around and your tools will ship within 5 business days.**

| ALtima® Blaze |       | Diameter |       | Shank   | OAL   | Flute Length | Corner Radius |
|---------------|-------|----------|-------|---------|-------|--------------|---------------|
| Tool No.      | EDP   | D1       | D2    | D2 (h6) | L1    | L2           | R             |
| 277LCB1250B   | 27953 | 1/8      | .1250 | 1/8     | 1-1/2 | 1/2          |               |
| 277LCB1252B   | 27954 | 1/8      | .1250 | 1/8     | 1-1/2 | 1/2          | .015          |
| 277LCB1870B   | 27955 | 3/16     | .1875 | 3/16    | 2-1/2 | 3/4          |               |
| 277LCB1872B   | 27956 | 3/16     | .1875 | 3/16    | 2-1/2 | 3/4          | .015          |
| 277LCB1874B   | 27957 | 3/16     | .1875 | 3/16    | 2-1/2 | 3/4          | .030          |
| 277LCB2500B   | 27958 | 1/4      | .2500 | 1/4     | 3     | 1-1/4        |               |
| 277LCB2502B   | 27959 | 1/4      | .2500 | 1/4     | 3     | 1-1/4        | .015          |
| 277LCB2504B   | 27960 | 1/4      | .2500 | 1/4     | 3     | 1-1/4        | .030          |
| 277XCB2500B   | 27961 | 1/4      | .2500 | 1/4     | 4     | 1-3/4        |               |
| 277XCB2502B   | 27962 | 1/4      | .2500 | 1/4     | 4     | 1-3/4        | .015          |
| 277XCB2504B   | 27963 | 1/4      | .2500 | 1/4     | 4     | 1-3/4        | .030          |
| 277LCB3120B   | 27964 | 5/16     | .3125 | 5/16    | 3     | 1-1/4        |               |
| 277LCB3122B   | 27965 | 5/16     | .3125 | 5/16    | 3     | 1-1/4        | .015          |
| 277LCB3124B   | 27966 | 5/16     | .3125 | 5/16    | 3     | 1-1/4        | .030          |
| 277LCB3126B   | 27967 | 5/16     | .3125 | 5/16    | 3     | 1-1/4        | .060          |
| 277XCB3120B   | 27968 | 5/16     | .3125 | 5/16    | 4     | 1-3/4        |               |
| 277XCB3122B   | 27969 | 5/16     | .3125 | 5/16    | 4     | 1-3/4        | .015          |
| 277XCB3124B   | 27970 | 5/16     | .3125 | 5/16    | 4     | 1-3/4        | .030          |
| 277XCB3126B   | 27971 | 5/16     | .3125 | 5/16    | 4     | 1-3/4        | .060          |
| 277CB37510B   | 27972 | 3/8      | .3750 | 3/8     | 2-1/2 | 7/8          |               |
| 277CB37511B   | 27973 | 3/8      | .3750 | 3/8     | 2-1/2 | 7/8          | .010          |
| 277CB37512B   | 27974 | 3/8      | .3750 | 3/8     | 2-1/2 | 7/8          | .015          |
| 277CB37513B   | 27975 | 3/8      | .3750 | 3/8     | 2-1/2 | 7/8          | .020          |
| 277CB37514B   | 27976 | 3/8      | .3750 | 3/8     | 2-1/2 | 7/8          | .030          |
| 277CB37516B   | 27988 | 3/8      | .3750 | 3/8     | 2-1/2 | 7/8          | .060          |
| 277LCB3750B   | 27977 | 3/8      | .3750 | 3/8     | 4     | 1-1/2        |               |
| 277LCB3752B   | 27978 | 3/8      | .3750 | 3/8     | 4     | 1-1/2        | .015          |
| 277LCB3754B   | 27979 | 3/8      | .3750 | 3/8     | 4     | 1-1/2        | .030          |
| 277LCB3756B   | 27980 | 3/8      | .3750 | 3/8     | 4     | 1-1/2        | .060          |
| 277XCB3750B   | 27981 | 3/8      | .3750 | 3/8     | 4     | 2-1/2        |               |
| 277XCB3752B   | 27982 | 3/8      | .3750 | 3/8     | 4     | 2-1/2        | .015          |
| 277XCB3754B   | 27983 | 3/8      | .3750 | 3/8     | 4     | 2-1/2        | .030          |
| 277XCB3756B   | 27984 | 3/8      | .3750 | 3/8     | 4     | 2-1/2        | .060          |
| 277LCB4370B   | 27985 | 7/16     | .4375 | 7/16    | 4     | 2            |               |
| 277LCB4372B   | 27986 | 7/16     | .4375 | 7/16    | 4     | 2            | .015          |
| 277LCB4374B   | 27987 | 7/16     | .4375 | 7/16    | 4     | 2            | .030          |
| 277CB50020B   | 27993 | 1/2      | .5000 | 1/2     | 3     | 1-1/4        |               |
| 277CB50021B   | 27994 | 1/2      | .5000 | 1/2     | 3     | 1-1/4        | .010          |
| 277CB50022B   | 27995 | 1/2      | .5000 | 1/2     | 3     | 1-1/4        | .015          |
| 277CB50023B   | 27996 | 1/2      | .5000 | 1/2     | 3     | 1-1/4        | .020          |

| Inch      |               |
|-----------|---------------|
| D1        | Tolerance     |
| 1/8 - 1/4 | +0.000/-0.002 |
| >1/4 - 1  | +0.000/-0.003 |

| Inch          |                |
|---------------|----------------|
| D2            | Tolerance (h6) |
| .1182 - .2362 | +0/-0.00031    |
| .2363 - .3937 | +0/-0.00035    |
| .3938 - .7087 | +0/-0.00043    |
| .7088 - 1.000 | +0/-0.00051    |

| Inch    |                 |
|---------|-----------------|
| R       | Tolerance       |
| 1/8 - 1 | +0.0000/-0.0016 |

## Materials



Steels



Stainless Steels

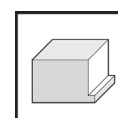


Cast Iron

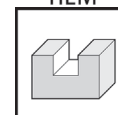


Special Alloys

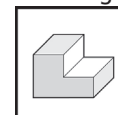
## Applications



HEM



Slotting



Traditional Roughing

## Series 277CB Continued

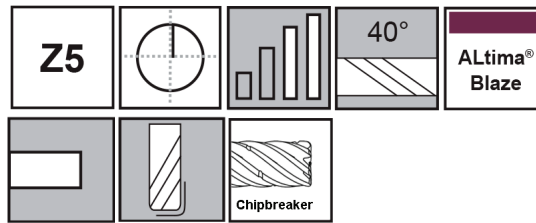


| ALtima® Blaze |       | Diameter |         | Shank   | OAL   | Flute Length | Corner Radius |
|---------------|-------|----------|---------|---------|-------|--------------|---------------|
|               |       | D1       |         | D2 (h6) | L1    | L2           | R             |
| Tool No.      | EDP   | Inch     | Decimal | Inch    | Inch  | Inch         | Inch          |
| 277CB50024B   | 27997 | 1/2      | .5000   | 1/2     | 3     | 1-1/4        | .030          |
| 277CB50026B   | 27989 | 1/2      | .5000   | 1/2     | 3     | 1-1/4        | .060          |
| 277LCB5000B   | 27998 | 1/2      | .5000   | 1/2     | 4     | 2            |               |
| 277LCB5002B   | 27999 | 1/2      | .5000   | 1/2     | 4     | 2            | .015          |
| 277LCB5004B   | 28000 | 1/2      | .5000   | 1/2     | 4     | 2            | .030          |
| 277LCB5006B   | 28002 | 1/2      | .5000   | 1/2     | 4     | 2            | .060          |
| 277XCB5000B   | 28003 | 1/2      | .5000   | 1/2     | 5     | 3            |               |
| 277XCB5002B   | 28004 | 1/2      | .5000   | 1/2     | 5     | 3            | .015          |
| 277XCB5004B   | 28005 | 1/2      | .5000   | 1/2     | 5     | 3            | .030          |
| 277XCB5006B   | 28007 | 1/2      | .5000   | 1/2     | 5     | 3            | .060          |
| 277CB62510B   | 28008 | 5/8      | .6250   | 5/8     | 3-1/2 | 1-1/4        |               |
| 277CB62512B   | 28009 | 5/8      | .6250   | 5/8     | 3-1/2 | 1-1/4        | .015          |
| 277CB62514B   | 28010 | 5/8      | .6250   | 5/8     | 3-1/2 | 1-1/4        | .030          |
| 277CB62516B   | 27990 | 5/8      | .6250   | 5/8     | 3-1/2 | 1-1/4        | .060          |
| 277LCB6250B   | 28012 | 5/8      | .6250   | 5/8     | 5     | 2-1/4        |               |
| 277LCB6252B   | 28013 | 5/8      | .6250   | 5/8     | 5     | 2-1/4        | .015          |
| 277LCB6254B   | 28014 | 5/8      | .6250   | 5/8     | 5     | 2-1/4        | .030          |
| 277LCB6256B   | 28015 | 5/8      | .6250   | 5/8     | 5     | 2-1/4        | .060          |
| 277XCB6250B   | 28017 | 5/8      | .6250   | 5/8     | 6     | 3            |               |
| 277XCB6252B   | 28018 | 5/8      | .6250   | 5/8     | 6     | 3            | .015          |
| 277XCB6254B   | 28019 | 5/8      | .6250   | 5/8     | 6     | 3            | .030          |
| 277XCB6256B   | 28020 | 5/8      | .6250   | 5/8     | 6     | 3            | .060          |
| 277CB75010B   | 28022 | 3/4      | .7500   | 3/4     | 4     | 1-5/8        |               |
| 277CB75012B   | 28023 | 3/4      | .7500   | 3/4     | 4     | 1-5/8        | .015          |
| 277CB75014B   | 28024 | 3/4      | .7500   | 3/4     | 4     | 1-5/8        | .030          |
| 277CB75016B   | 27991 | 3/4      | .7500   | 3/4     | 4     | 1-5/8        | .060          |
| 277LCB7500B   | 28025 | 3/4      | .7500   | 3/4     | 5     | 2-1/4        |               |
| 277LCB7502B   | 28027 | 3/4      | .7500   | 3/4     | 5     | 2-1/4        | .015          |
| 277LCB7504B   | 28028 | 3/4      | .7500   | 3/4     | 5     | 2-1/4        | .030          |
| 277LCB7506B   | 28029 | 3/4      | .7500   | 3/4     | 5     | 2-1/4        | .060          |
| 277XCB7500B   | 28030 | 3/4      | .7500   | 3/4     | 6     | 3            |               |
| 277XCB7502B   | 28032 | 3/4      | .7500   | 3/4     | 6     | 3            | .015          |
| 277XCB7504B   | 28033 | 3/4      | .7500   | 3/4     | 6     | 3            | .030          |
| 277XCB7506B   | 28034 | 3/4      | .7500   | 3/4     | 6     | 3            | .060          |
| 277XXCB750B   | 28035 | 3/4      | .7500   | 3/4     | 7     | 4-1/8        |               |
| 277XXCB754B   | 28037 | 3/4      | .7500   | 3/4     | 7     | 4-1/8        | .030          |
| 277XXCB756B   | 28038 | 3/4      | .7500   | 3/4     | 7     | 4-1/8        | .060          |
| 277CB10010B   | 28039 | 1        | 1.0000  | 1       | 4     | 1-1/2        |               |
| 277CB10012B   | 28040 | 1        | 1.0000  | 1       | 4     | 1-1/2        | .015          |
| 277CB10014B   | 28042 | 1        | 1.0000  | 1       | 4     | 1-1/2        | .030          |
| 277CB10016B   | 27992 | 1        | 1.0000  | 1       | 4     | 1-1/2        | .060          |
| 277LCB1000B   | 28043 | 1        | 1.0000  | 1       | 5     | 2-1/4        |               |
| 277LCB1002B   | 28044 | 1        | 1.0000  | 1       | 5     | 2-1/4        | .015          |
| 277LCB1004B   | 28045 | 1        | 1.0000  | 1       | 5     | 2-1/4        | .030          |
| 277LCB1006B   | 28047 | 1        | 1.0000  | 1       | 5     | 2-1/4        | .060          |
| 277XCB1000B   | 28048 | 1        | 1.0000  | 1       | 6     | 3            |               |
| 277XCB1002B   | 28049 | 1        | 1.0000  | 1       | 6     | 3            | .015          |
| 277XCB1004B   | 28050 | 1        | 1.0000  | 1       | 6     | 3            | .030          |
| 277XCB1006B   | 28052 | 1        | 1.0000  | 1       | 6     | 3            | .060          |
| 277XXCB100B   | 28053 | 1        | 1.0000  | 1       | 7     | 4-1/8        |               |
| 277XXCB104B   | 28054 | 1        | 1.0000  | 1       | 7     | 4-1/8        | .030          |
| 277XXCB106B   | 28055 | 1        | 1.0000  | 1       | 7     | 4-1/8        | .060          |

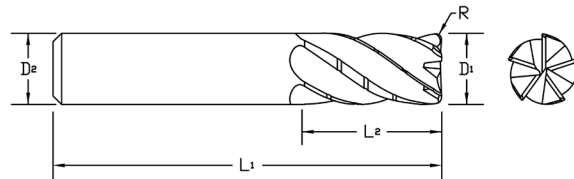
**For quick delivery on non-stocked sizes, request Rapid Turn Around and your tools will ship within 5 business days.**



# TuffCut® XT Series 278CB



- Staggered Chipbreaker technology.
- Improved geometries.
- Enhanced corner protection.



*For quick delivery on non-stocked sizes, request Rapid Turn Around and your tools will ship within 5 business days.*

| ALtima® Blaze |       | Diameter |         | Shank   | OAL   | Flute Length | Corner Radius |
|---------------|-------|----------|---------|---------|-------|--------------|---------------|
|               |       | D1       |         | D2 (h6) | L1    | L2           | R             |
| Tool No.      | EDP   | Inch     | Decimal | Inch    | Inch  | Inch         | Inch          |
| 278LCB25000B  | 03900 | 1/4      | .2500   | 1/4     | 3     | 1-1/4        |               |
| 278LCB25002B  | 03901 | 1/4      | .2500   | 1/4     | 3     | 1-1/4        | .015          |
| 278LCB25004B  | 03902 | 1/4      | .2500   | 1/4     | 3     | 1-1/4        | .030          |
| 278LCB25006B  | 03903 | 1/4      | .2500   | 1/4     | 3     | 1-1/4        | .060          |
| 278LCB25007B  | 03904 | 1/4      | .2500   | 1/4     | 3     | 1-1/4        | .090          |
| 278XCB25000B  | 03905 | 1/4      | .2500   | 1/4     | 4     | 1-3/4        |               |
| 278XCB25002B  | 03906 | 1/4      | .2500   | 1/4     | 4     | 1-3/4        | .015          |
| 278XCB25004B  | 03907 | 1/4      | .2500   | 1/4     | 4     | 1-3/4        | .030          |
| 278CB37510B   | 03942 | 3/8      | .3750   | 3/8     | 2-1/2 | 1            |               |
| 278CB37511B   | 03943 | 3/8      | .3750   | 3/8     | 2-1/2 | 1            | .010          |
| 278CB37512B   | 03944 | 3/8      | .3750   | 3/8     | 2-1/2 | 1            | .015          |
| 278CB37513B   | 03945 | 3/8      | .3750   | 3/8     | 2-1/2 | 1            | .020          |
| 278CB37514B   | 03946 | 3/8      | .3750   | 3/8     | 2-1/2 | 1            | .030          |
| 278CB37516B   | 03947 | 3/8      | .3750   | 3/8     | 2-1/2 | 1            | .060          |
| 278LCB37500B  | 03908 | 3/8      | .3750   | 3/8     | 4     | 1-5/8        |               |
| 278LCB37502B  | 03909 | 3/8      | .3750   | 3/8     | 4     | 1-5/8        | .015          |
| 278LCB37504B  | 03910 | 3/8      | .3750   | 3/8     | 4     | 1-5/8        | .030          |
| 278LCB37506B  | 03911 | 3/8      | .3750   | 3/8     | 4     | 1-5/8        | .060          |
| 278LCB37507B  | 03912 | 3/8      | .3750   | 3/8     | 4     | 1-5/8        | .090          |
| 278LCB37508B  | 03913 | 3/8      | .3750   | 3/8     | 4     | 1-5/8        | .120          |
| 278LCB375011B | 03914 | 3/8      | .3750   | 3/8     | 4     | 1-5/8        | .156          |
| 278XCB37500B  | 03915 | 3/8      | .3750   | 3/8     | 4     | 2-1/2        |               |
| 278XCB37502B  | 03916 | 3/8      | .3750   | 3/8     | 4     | 2-1/2        | .015          |
| 278XCB37504B  | 03917 | 3/8      | .3750   | 3/8     | 4     | 2-1/2        | .030          |
| 278CB50020B   | 03948 | 1/2      | .5000   | 1/2     | 3     | 1-1/4        |               |
| 278CB50021B   | 03949 | 1/2      | .5000   | 1/2     | 3     | 1-1/4        | .010          |
| 278CB50022B   | 03950 | 1/2      | .5000   | 1/2     | 3     | 1-1/4        | .015          |
| 278CB50023B   | 03951 | 1/2      | .5000   | 1/2     | 3     | 1-1/4        | .020          |
| 278CB50024B   | 03952 | 1/2      | .5000   | 1/2     | 3     | 1-1/4        | .030          |
| 278CB50026B   | 03953 | 1/2      | .5000   | 1/2     | 3     | 1-1/4        | .060          |
| 278CB50030B   | 19401 | 1/2      | .5000   | 1/2     | 4     | 1-5/8        |               |
| 278CB50032B   | 19432 | 1/2      | .5000   | 1/2     | 4     | 1-5/8        | .015          |
| 278CB50034B   | 03956 | 1/2      | .5000   | 1/2     | 4     | 1-5/8        | .030          |

| Inch     |               |
|----------|---------------|
| D1       | Tolerance     |
| 1/4      | +0.000/-0.002 |
| >1/4 - 1 | +0.000/-0.003 |

| Inch          |                |
|---------------|----------------|
| D2            | Tolerance (h6) |
| .2500 - .3937 | +0/-0.00035    |
| .3938 - .7087 | +0/-0.00043    |
| .7088 - 1.000 | +0/-0.00051    |

| Inch    |                 |
|---------|-----------------|
| R       | Tolerance       |
| 1/4 - 1 | +0.0000/-0.0016 |

## Materials



Steels



Stainless Steels

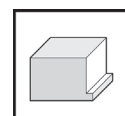


Cast Iron

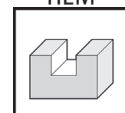


Special Alloys

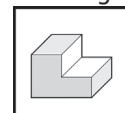
## Applications



HEM



Slotting



Traditional Roughing

## Series 278CB Continued



| ALtima® Blaze |       | Diameter |         | Shank   | OAL   | Flute Length | Corner Radius |
|---------------|-------|----------|---------|---------|-------|--------------|---------------|
|               |       | D1       |         | D2 (h6) | L1    | L2           | R             |
| Tool No.      | EDP   | Inch     | Decimal | Inch    | Inch  | Inch         | Inch          |
| 278CB50036B   | 03957 | 1/2      | .5000   | 1/2     | 4     | 1-5/8        | .060          |
| 278LCB50000B  | 03918 | 1/2      | .5000   | 1/2     | 4     | 2            |               |
| 278LCB50002B  | 03919 | 1/2      | .5000   | 1/2     | 4     | 2            | .015          |
| 278LCB50004B  | 03920 | 1/2      | .5000   | 1/2     | 4     | 2            | .030          |
| 278XCB50000B  | 03921 | 1/2      | .5000   | 1/2     | 5     | 3            |               |
| 278XCB50002B  | 03922 | 1/2      | .5000   | 1/2     | 5     | 3            | .015          |
| 278XCB50004B  | 03923 | 1/2      | .5000   | 1/2     | 5     | 3            | .030          |
| 278CB62510B   | 03958 | 5/8      | .6250   | 5/8     | 3-1/2 | 1-1/4        |               |
| 278CB62512B   | 03959 | 5/8      | .6250   | 5/8     | 3-1/2 | 1-1/4        | .015          |
| 278CB62514B   | 03960 | 5/8      | .6250   | 5/8     | 3-1/2 | 1-1/4        | .030          |
| 278CB62516B   | 03961 | 5/8      | .6250   | 5/8     | 3-1/2 | 1-1/4        | .060          |
| 278LCB62500B  | 03924 | 5/8      | .6250   | 5/8     | 5     | 2-1/4        |               |
| 278LCB62502B  | 03925 | 5/8      | .6250   | 5/8     | 5     | 2-1/4        | .015          |
| 278LCB62504B  | 03926 | 5/8      | .6250   | 5/8     | 5     | 2-1/4        | .030          |
| 278XCB62500B  | 03927 | 5/8      | .6250   | 5/8     | 6     | 3            |               |
| 278XCB62502B  | 03928 | 5/8      | .6250   | 5/8     | 6     | 3            | .015          |
| 278XCB62504B  | 03929 | 5/8      | .6250   | 5/8     | 6     | 3            | .030          |
| 278CB75010B   | 03962 | 3/4      | .7500   | 3/4     | 4     | 1-1/2        |               |
| 278CB75012B   | 03963 | 3/4      | .7500   | 3/4     | 4     | 1-1/2        | .015          |
| 278CB75014B   | 03964 | 3/4      | .7500   | 3/4     | 4     | 1-1/2        | .030          |
| 278CB75016B   | 03965 | 3/4      | .7500   | 3/4     | 4     | 1-1/2        | .060          |
| 278LCB75000B  | 03930 | 3/4      | .7500   | 3/4     | 5     | 2-1/4        |               |
| 278LCB75002B  | 03931 | 3/4      | .7500   | 3/4     | 5     | 2-1/4        | .015          |
| 278LCB75004B  | 03932 | 3/4      | .7500   | 3/4     | 5     | 2-1/4        | .030          |
| 278XCB75000B  | 03933 | 3/4      | .7500   | 3/4     | 6     | 3            |               |
| 278XCB75002B  | 03934 | 3/4      | .7500   | 3/4     | 6     | 3            | .015          |
| 278XCB75004B  | 03935 | 3/4      | .7500   | 3/4     | 6     | 3            | .030          |
| 278CB10010B   | 03966 | 1        | 1.0000  | 1       | 4     | 1-1/2        |               |
| 278CB10014B   | 03967 | 1        | 1.0000  | 1       | 4     | 1-1/2        | .030          |
| 278CB10016B   | 03968 | 1        | 1.0000  | 1       | 4     | 1-1/2        | .060          |
| 278LCB10000B  | 03936 | 1        | 1.0000  | 1       | 5     | 2-1/4        |               |
| 278LCB10002B  | 03937 | 1        | 1.0000  | 1       | 5     | 2-1/4        | .015          |
| 278L1CB0004B  | 03938 | 1        | 1.0000  | 1       | 5     | 2-1/4        | .030          |
| 278XCB10000B  | 03939 | 1        | 1.0000  | 1       | 6     | 3            |               |
| 278XCB10002B  | 03940 | 1        | 1.0000  | 1       | 6     | 3            | .015          |
| 278XCB10004B  | 03941 | 1        | 1.0000  | 1       | 6     | 3            | .030          |

*For quick delivery on non-stocked sizes, request Rapid Turn Around and your tools will ship within 5 business days.*

### Safety Note

Always wear the appropriate personal protective equipment such as safety glasses and protective clothing when using solid carbide or HSS cutting tools. Machines should be fully guarded. Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

**⚠ WARNING:** This product can expose you to chemicals including nickel, cobalt, and lead, which are known to the State of California to cause cancer, and chemicals including lead which are known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

## 277CB Recommended Cutting Data - Profile Milling Inch



| Workpiece Material Group                                                                                                                   | ISO | Hardness     | Coolant<br>● Preferred<br>○ Possible<br>x Not Possible |   |   | Profiling (ae) |      |     |          | End Mill Diameter                                                                                                                                                                                                                           |       |       |       |       |       |       |       |       |
|--------------------------------------------------------------------------------------------------------------------------------------------|-----|--------------|--------------------------------------------------------|---|---|----------------|------|-----|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                                                                                                                            |     |              |                                                        |   |   |                |      |     |          | 1/8"                                                                                                                                                                                                                                        | 3/16" | 1/4"  | 5/16" | 3/8"  | 1/2"  | 5/8"  | 3/4"  | 1"    |
|                                                                                                                                            |     |              |                                                        |   |   | 5%             | 10%  | 25% | 50%      | *Profile milling at ≥ 50% ap is not recommended for diameters 1/4" and below.<br><br>← Multiply fz by this Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing. |       |       |       |       |       |       |       |       |
|                                                                                                                                            |     |              |                                                        |   |   | 2.3            | 1.8  | 1.2 | 1.0      |                                                                                                                                                                                                                                             |       |       |       |       |       |       |       |       |
|                                                                                                                                            |     |              |                                                        |   |   | Max.           | Air  | MMS | vc - SFM | fz - in/tooth                                                                                                                                                                                                                               |       |       |       |       |       |       |       |       |
| Low Carbon Steels<br>1018, 1020                                                                                                            | P   | up to 28 Rc  | ●                                                      | ● | ● | 1475           | 1150 | 980 | 500      | .0012                                                                                                                                                                                                                                       | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Medium Carbon Steels<br>1140, 1145                                                                                                         | P   | 28 to 38 Rc  | ●                                                      | ● | ● | 1130           | 900  | 840 | 250      | .0012                                                                                                                                                                                                                                       | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Alloy Steels<br>4140, 4145                                                                                                                 | P   | 28 to 44 Rc  | ●                                                      | ● | ● | 1035           | 840  | 755 | 250      | .0012                                                                                                                                                                                                                                       | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Die / Tool Steels<br>A2, D2, H13, P20                                                                                                      | P   | 28 to 44 Rc  | ●                                                      | ● | ● | 900            | 725  | 615 | 200      | .0012                                                                                                                                                                                                                                       | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Hardened Steels<br>A2, D2                                                                                                                  | H   | 45 to 50 Rc  | ●                                                      | ○ | ○ | 610            | 495  | 325 | 250      | .0006                                                                                                                                                                                                                                       | 0.001 | .0012 | .0016 | .0020 | .0024 | .0030 | .0040 | .0050 |
| Hardened Steels<br>A2, D2                                                                                                                  | H   | 50 to 55 Rc  | ●                                                      | ○ | ○ | 510            | 410  | 280 | 200      | .0003                                                                                                                                                                                                                                       | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Stainless Steel - Easy to Machine<br>430F, 301, 303, 410, 416<br>Annealed, 420F, 430                                                       | M   | up to 28 Rc  | ●                                                      | x | ○ | 675            | 545  | 425 | 360      | .0012                                                                                                                                                                                                                                       | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Stainless Steel - Austenitic<br>301, 302, 303 High Tensile,<br>304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH                                 | M   | up to 28 Rc  | ●                                                      | x | ○ | 525            | 430  | 400 | 210      | .0012                                                                                                                                                                                                                                       | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Stainless Steel - Difficult to Machine<br>302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321                                     | M   | up to 28 Rc  | ●                                                      | x | ○ | 410            | 330  | 295 | 210      | .0012                                                                                                                                                                                                                                       | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Stainless Steel - Difficult to Machine<br>17-4 PH, PH13-8Mo, Nitronics                                                                     | M   | over 28 Rc   | ●                                                      | x | ○ | 525            | 430  | 395 | 110      | .0006                                                                                                                                                                                                                                       | .0010 | .0012 | .0016 | .0020 | .0024 | .0030 | .0040 | .0050 |
| Cobalt Chrome Alloys                                                                                                                       | M   | over 28 Rc   | ●                                                      | x | ○ | 410            | 325  | 295 | 130      | .0006                                                                                                                                                                                                                                       | .0010 | .0012 | .0016 | .0020 | .0024 | .0030 | .0040 | .0050 |
| Duplex (22%)                                                                                                                               | M   | over 28 Rc   | ●                                                      | x | ○ | 245            | 195  | 180 | 130      | .0006                                                                                                                                                                                                                                       | .0010 | .0012 | .0016 | .0020 | .0024 | .0030 | .0040 | .0050 |
| Super Duplex (25%)                                                                                                                         | M   | over 28 Rc   | ●                                                      | x | ○ | 245            | 195  | 180 | 110      | .0006                                                                                                                                                                                                                                       | .0010 | .0012 | .0016 | .0020 | .0024 | .0030 | .0040 | .0050 |
| High Temp Alloys                                                                                                                           | S   | up to 42 Rc  | ●                                                      | x | x | 180            | 150  | 130 | 85       | .0003                                                                                                                                                                                                                                       | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Inconel                                                                                                                                    | S   | up to 42 Rc  | ●                                                      | x | x | 180            | 150  | 130 | 85       | .0003                                                                                                                                                                                                                                       | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Titanium Alloys<br>6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr-4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al                                     | S   | up to 42 Rc  | ●                                                      | x | x | 375            | 350  | 330 | 175      | .0003                                                                                                                                                                                                                                       | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Cast-Iron - Gray CG, ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40                  | K   | up to 240 HB | ●                                                      | ○ | ○ | 1625           | 1295 | 870 | 350      | .0012                                                                                                                                                                                                                                       | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Cast Iron - Ductile & Malleable CGI<br>60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450 | K   | over 240 HB  | ●                                                      | ○ | ○ | 675            | 540  | 510 | 260      | .0012                                                                                                                                                                                                                                       | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |

**Spindle Maximum** - Should the calculated spindle speed be more than your actual spindle maximum, use this formula:  
 (Calculated Feed x Spindle Maximum)/Calculated Speed

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

## 277CB Recommended Cutting Data - Slotting Inch



| Workpiece<br>Material<br>Group                                                                                                                         | I<br>S<br>O | Hardness     | Coolant<br>• Preferred<br>o Possible<br>x Not Possible                            |                                                                                   |                                                                                   | Slotting                                                                          |                                                                                   |                                                                                   | End Mill Diameter                                                      |       |       |       |       |       |       |       |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                                                                                                                                        |             |              |  |  |  |  |  |  | 1/8"                                                                   | 3/16" | 1/4"  | 5/16  | 3/8   | 1/2   | 5/8   | 3/4   | 1     |
|                                                                                                                                                        |             |              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | *Slotting at > 25% ap is not recommended for diameters 1/4" and below. |       |       |       |       |       |       |       |       |
|                                                                                                                                                        |             |              |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   | fz - in/tooth                                                          |       |       |       |       |       |       |       |       |
| Max.                                                                                                                                                   | Air         | MMS          | vc - SFM                                                                          |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                        |       |       |       |       |       |       |       |       |
| Low Carbon Steels<br>1018, 1020                                                                                                                        | P           | up to 28 Rc  | •                                                                                 | •                                                                                 | •                                                                                 | 550                                                                               | 500                                                                               | 475                                                                               | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0025 | .0031 | .0040 | .0050 |
| Medium Carbon Steels<br>1140, 1145                                                                                                                     | P           | 28 to 38 Rc  | •                                                                                 | •                                                                                 | •                                                                                 | 275                                                                               | 250                                                                               | 225                                                                               | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0025 | .0031 | .0040 | .0050 |
| Alloy Steels<br>4140, 4145                                                                                                                             | P           | 28 to 44 Rc  | •                                                                                 | •                                                                                 | •                                                                                 | 275                                                                               | 250                                                                               | 225                                                                               | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0025 | .0031 | .0040 | .0050 |
| Die / Tool Steels<br>A2, D2, H13, P20                                                                                                                  | P           | 28 to 44 Rc  | •                                                                                 | •                                                                                 | •                                                                                 | 225                                                                               | 200                                                                               | 175                                                                               | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0025 | .0031 | .0040 | .0050 |
| Hardened Steels<br>A2, D2                                                                                                                              | H           | 45 to 50 Rc  | •                                                                                 | o                                                                                 | o                                                                                 | 275                                                                               | 250                                                                               | 225                                                                               | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Hardened Steels<br>A2, D2                                                                                                                              | H           | 50 to 55 Rc  | •                                                                                 | o                                                                                 | o                                                                                 | 225                                                                               | 200                                                                               | 175                                                                               | .0001                                                                  | .0002 | .0003 | .0004 | .0005 | .0006 | .0008 | .0010 | .0015 |
| Stainless Steel - Easy to Machine<br>430F, 301, 303, 410, 416<br>Annealed, 420F, 430                                                                   | M           | up to 28 Rc  | •                                                                                 | x                                                                                 | o                                                                                 | 385                                                                               | 360                                                                               | 350                                                                               | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0024 | .0031 | .0040 | .0050 |
| Stainless Steel - Austenitic<br>301, 302, 303 High Tensile,<br>304, 304L, 305, 420,<br>15-5PH, 17-4PH, 17-7PH                                          | M           | up to 28 Rc  | •                                                                                 | x                                                                                 | o                                                                                 | 225                                                                               | 210                                                                               | 200                                                                               | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0024 | .0031 | .0040 | .0050 |
| Stainless Steel - Difficult to Machine<br>302B, 304B, 309, 310, 316,<br>316B, 316L, 316Ti, 317,<br>317L, 321                                           | M           | up to 28 Rc  | •                                                                                 | x                                                                                 | o                                                                                 | 225                                                                               | 210                                                                               | 200                                                                               | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0024 | .0031 | .0040 | .0050 |
| Stainless Steel - Difficult to Machine<br>17-4 PH, PH13-8Mo,<br>Nitronics                                                                              | M           | over 28 Rc   | •                                                                                 | x                                                                                 | o                                                                                 | 125                                                                               | 110                                                                               | 100                                                                               | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Cobalt Chrome Alloys                                                                                                                                   | M           |              | •                                                                                 | x                                                                                 | o                                                                                 | 150                                                                               | 130                                                                               | 120                                                                               | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Duplex (22%)                                                                                                                                           | M           |              | •                                                                                 | x                                                                                 | o                                                                                 | 150                                                                               | 130                                                                               | 120                                                                               | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Super Duplex (25%)                                                                                                                                     | M           |              | •                                                                                 | x                                                                                 | o                                                                                 | 120                                                                               | 110                                                                               | 100                                                                               | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| High Temp Alloys                                                                                                                                       | S           | up to 42 Rc  | •                                                                                 | x                                                                                 | x                                                                                 | 100                                                                               | 85                                                                                | 75                                                                                | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Inconel                                                                                                                                                | S           |              | •                                                                                 | x                                                                                 | x                                                                                 | 95                                                                                | 85                                                                                | 75                                                                                | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Titanium Alloys<br>6Al-4V, 5Al-2.5 Sn,<br>6Al-2 Sn-4Zr-6Mo,<br>3Al-8V-6Cr4Mo-4Zr,<br>10V-2Fe-3Al,<br>13V-11Cr-3Al                                      | S           | up to 42 Rc  | •                                                                                 | x                                                                                 | x                                                                                 | 180                                                                               | 175                                                                               | 160                                                                               | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Cast-Iron - Gray CG,<br>ASTM A48, CLASS 20,<br>25, 30, 35, SAE J431C,<br>GRADES G1800, G3000,<br>G3500, GG 10, 15, 20, 25,<br>30, 35, 40               | K           | up to 240 HB | •                                                                                 | o                                                                                 | o                                                                                 | 375                                                                               | 350                                                                               | 325                                                                               | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0024 | .0031 | .0040 | .0050 |
| Cast Iron - Ductile &<br>Malleable CGI 60-40-18,<br>65-45-12, D4018, D4512,<br>D5506, 32510, 35108,<br>M3210, M4504, M5503,<br>250, 300, 350, 400, 450 | K           | over 240 HB  | •                                                                                 | o                                                                                 | o                                                                                 | 275                                                                               | 260                                                                               | 250                                                                               | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0024 | .0031 | .0040 | .0050 |

**Spindle Maximum - Should the calculated spindle speed be more than your actual spindle maximum, use this formula:  
(Calculated Feed x Spindle Maximum)/Calculated Speed**

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

| Workpiece Material Group                                                                                                                | ISO | Hardness     | Coolant<br>● Preferred<br>○ Possible<br>x Not Possible                                                                                                                                                                                                |   |   | Profiling (ae)                                                                                                                                                                                                                                                                                                                          |      |     |          | End Mill Diameter                                                                                                                                                                                                                      |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                                                                                                                         |     |              |                                                                                                                                                                                                                                                       |   |   |     |      |     |          | 1/8"                                                                                                                                                                                                                                   | 3/16" | 1/4"  | 5/16" | 3/8"  | 1/2"  | 5/8"  | 3/4"  | 1"    |
|                                                                                                                                         |     |              |                                                                                                                                                                                                                                                       |   |   | 5%                                                                                                                                                                                                                                                                                                                                      | 10%  | 25% | 50%      | *Profile Milling at ≥ 50% ap is not recommended for diameters 1/4" and below.                                                                                                                                                          |       |       |       |       |       |       |       |       |
|                                                                                                                                         |     |              |    |   |   | 2.3                                                                                                                                                                                                                                                                                                                                     | 1.8  | 1.2 | 1.0      |  Multiply fz by this Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing. |       |       |       |       |       |       |       |       |
|                                                                                                                                         |     |              |                                                                                                                                                                                                                                                       |   |   | Max.                                                                                                                                                                                                                                                                                                                                    | Air  | MMS | vc - SFM | fz - in/tooth                                                                                                                                                                                                                          |       |       |       |       |       |       |       |       |
| Low Carbon Steels<br>1018, 1020                                                                                                         | P   | up to 28 Rc  | ●                                                                                                                                                                                                                                                     | ● | ● | 1475                                                                                                                                                                                                                                                                                                                                    | 1150 | 980 | 500      | .0012                                                                                                                                                                                                                                  | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Medium Carbon Steels<br>1140, 1145                                                                                                      | P   | 28 to 38 Rc  | ●                                                                                                                                                                                                                                                     | ● | ● | 1130                                                                                                                                                                                                                                                                                                                                    | 900  | 830 | 250      | .0012                                                                                                                                                                                                                                  | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Alloy Steels<br>4140, 4145                                                                                                              | P   | 28 to 44 Rc  | ●                                                                                                                                                                                                                                                     | ● | ● | 1035                                                                                                                                                                                                                                                                                                                                    | 840  | 755 | 250      | .0012                                                                                                                                                                                                                                  | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Die / Tool Steels<br>A2, D2, H13, P20                                                                                                   | P   | 28 to 44 Rc  | ●                                                                                                                                                                                                                                                     | ● | ● | 900                                                                                                                                                                                                                                                                                                                                     | 725  | 615 | 200      | .0012                                                                                                                                                                                                                                  | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Hardened Steels<br>A2, D2                                                                                                               | H   | 45 to 50 Rc  | ●                                                                                                                                                                                                                                                     | ○ | ○ | 610                                                                                                                                                                                                                                                                                                                                     | 495  | 325 | 250      | .0006                                                                                                                                                                                                                                  | .0010 | .0012 | .0016 | .0020 | .0024 | .0030 | .0040 | .0050 |
| Hardened Steels<br>A2, D2                                                                                                               | H   | 50 to 55 Rc  | ●                                                                                                                                                                                                                                                     | ○ | ○ | 510                                                                                                                                                                                                                                                                                                                                     | 410  | 280 | 200      | .0003                                                                                                                                                                                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Stainless Steel - Easy to Machine<br>430F, 301, 303, 410, 416 Annealed, 420F, 430                                                       | M   | up to 28 Rc  | ●                                                                                                                                                                                                                                                     | x | ○ | 675                                                                                                                                                                                                                                                                                                                                     | 545  | 425 | 360      | .0012                                                                                                                                                                                                                                  | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Stainless Steel - Austenitic<br>301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH                                 | M   | up to 28 Rc  | ●                                                                                                                                                                                                                                                     | x | ○ | 525                                                                                                                                                                                                                                                                                                                                     | 430  | 400 | 210      | .0012                                                                                                                                                                                                                                  | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Stainless Steel - Difficult to Machine<br>302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321                                  | M   | up to 28 Rc  | ●                                                                                                                                                                                                                                                     | x | ○ | 410                                                                                                                                                                                                                                                                                                                                     | 330  | 295 | 210      | .0012                                                                                                                                                                                                                                  | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Stainless Steel - Difficult to Machine<br>17-4 PH, PH13-8Mo, Nitronics                                                                  | M   | over 28 Rc   | ●                                                                                                                                                                                                                                                     | x | ○ | 525                                                                                                                                                                                                                                                                                                                                     | 430  | 395 | 110      | .0006                                                                                                                                                                                                                                  | .0010 | .0012 | .0016 | .0020 | .0024 | .0030 | .0040 | .0050 |
| Cobalt Chrome Alloys                                                                                                                    | M   |              | ●                                                                                                                                                                                                                                                     | x | ○ | 410                                                                                                                                                                                                                                                                                                                                     | 325  | 295 | 130      | .0006                                                                                                                                                                                                                                  | .0010 | .0012 | .0016 | .0020 | .0024 | .0030 | .0040 | .0050 |
| Duplex (22%)                                                                                                                            | M   |              | ●                                                                                                                                                                                                                                                     | x | ○ | 245                                                                                                                                                                                                                                                                                                                                     | 195  | 180 | 130      | .0006                                                                                                                                                                                                                                  | .0010 | .0012 | .0016 | .0020 | .0024 | .0030 | .0040 | .0050 |
| Super Duplex (25%)                                                                                                                      | M   |              | ●                                                                                                                                                                                                                                                     | x | ○ | 245                                                                                                                                                                                                                                                                                                                                     | 195  | 180 | 110      | .0006                                                                                                                                                                                                                                  | .0010 | .0012 | .0016 | .0020 | .0024 | .0030 | .0040 | .0050 |
| High Temp Alloys                                                                                                                        | S   |              | ●                                                                                                                                                                                                                                                     | x | x | 180                                                                                                                                                                                                                                                                                                                                     | 150  | 130 | 85       | .0003                                                                                                                                                                                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Inconel                                                                                                                                 | S   | up to 42 Rc  | ●                                                                                                                                                                                                                                                     | x | x | 180                                                                                                                                                                                                                                                                                                                                     | 150  | 130 | 85       | .0003                                                                                                                                                                                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Titanium Alloys<br>6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al                                   | S   | up to 42 Rc  | ●                                                                                                                                                                                                                                                     | x | x | 375                                                                                                                                                                                                                                                                                                                                     | 350  | 330 | 175      | .0003                                                                                                                                                                                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Cast-Iron - Gray CG, ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40               | K   | up to 240 HB | ●                                                                                                                                                                                                                                                     | ○ | ○ | 1625                                                                                                                                                                                                                                                                                                                                    | 1295 | 870 | 350      | .0012                                                                                                                                                                                                                                  | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |
| Cast Iron - Ductile & Malleable CGI 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450 | K   | over 240 HB  | ●                                                                                                                                                                                                                                                     | ○ | ○ | 675                                                                                                                                                                                                                                                                                                                                     | 540  | 510 | 260      | .0012                                                                                                                                                                                                                                  | .0020 | .0024 | .0031 | .0039 | .0047 | .0060 | .0078 | .0100 |

**Spindle Maximum** - Should the calculated spindle speed be more than your actual spindle maximum, use this formula:  
**(Calculated Feed x Spindle Maximum)/Calculated Speed**

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

## 278CB Recommended Cutting Data - Slotting Inch



| Workpiece Material Group                                                                                                                | ISO | Hardness     | Coolant<br>• Preferred<br>o Possible<br>x Not Possible |   |   | Slotting |     |     | End Mill Diameter                                                      |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----|--------------|--------------------------------------------------------|---|---|----------|-----|-----|------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                                                                                                                         |     |              |                                                        |   |   |          |     |     | 1/8"                                                                   | 3/16" | 1/4"  | 5/16" | 3/8"  | 1/2"  | 5/8"  | 3/4"  | 1"    |
|                                                                                                                                         |     |              |                                                        |   |   |          |     |     | *Slotting at > 25% ap is not recommended for diameters 1/4" and below. |       |       |       |       |       |       |       |       |
|                                                                                                                                         |     |              |                                                        |   |   |          |     |     | fz - in/tooth                                                          |       |       |       |       |       |       |       |       |
| Low Carbon Steels<br>1018, 1020                                                                                                         | P   | up to 28 Rc  | •                                                      | • | • | 550      | 500 | 475 | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0025 | .0031 | .0040 | .0050 |
| Medium Carbon Steels<br>1140, 1145                                                                                                      | P   | 28 to 38 Rc  | •                                                      | • | • | 275      | 250 | 225 | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0025 | .0031 | .0040 | .0050 |
| Alloy Steels<br>4140, 4145                                                                                                              | P   | 28 to 44 Rc  | •                                                      | • | • | 275      | 250 | 225 | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0025 | .0031 | .0040 | .0050 |
| Die / Tool Steels<br>A2, D2, H13, P20                                                                                                   | P   | 28 to 44 Rc  | •                                                      | • | • | 225      | 200 | 175 | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0025 | .0031 | .0040 | .0050 |
| Hardened Steels<br>A2, D2                                                                                                               | H   | 45 to 50 Rc  | •                                                      | o | o | 275      | 250 | 225 | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Hardened Steels<br>A2, D2                                                                                                               | H   | 50 to 55 Rc  | •                                                      | o | o | 225      | 200 | 175 | .0001                                                                  | .0002 | .0003 | .0004 | .0005 | .0006 | .0008 | .0010 | .0015 |
| Stainless Steel - Easy to Machine<br>430F, 301, 303, 410, 416 Annealed, 420F, 430                                                       | M   | up to 28 Rc  | •                                                      | x | o | 385      | 360 | 350 | .0002                                                                  | .0004 | .0008 | .0012 | .0014 | .0018 | .0022 | .0026 | .0038 |
| Stainless Steel - Austenitic<br>301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH                                 | M   | up to 28 Rc  | •                                                      | x | o | 225      | 210 | 200 | .0002                                                                  | .0004 | .0008 | .0012 | .0014 | .0018 | .0022 | .0026 | .0038 |
| Stainless Steel - Difficult to Machine<br>302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321                                  | M   | up to 28 Rc  | •                                                      | x | o | 225      | 210 | 200 | .0002                                                                  | .0004 | .0008 | .0012 | .0014 | .0018 | .0022 | .0026 | .0038 |
| Stainless Steel - Difficult to Machine<br>17-4 PH, PH13-8Mo, Nitronics                                                                  | M   | over 28 Rc   | •                                                      | x | o | 125      | 110 | 100 | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Cobalt Chrome Alloys                                                                                                                    | M   |              | •                                                      | x | o | 150      | 130 | 120 | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Duplex (22%)                                                                                                                            | M   |              | •                                                      | x | o | 150      | 130 | 120 | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Super Duplex (25%)                                                                                                                      | M   |              | •                                                      | x | o | 120      | 110 | 100 | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| High Temp Alloys                                                                                                                        | S   | up to 42 Rc  | •                                                      | x | x | 100      | 85  | 75  | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Inconel                                                                                                                                 | S   |              | •                                                      | x | x | 95       | 85  | 75  | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Titanium Alloys<br>6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr-4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al                                  | S   | up to 42 Rc  | •                                                      | x | x | 180      | 175 | 160 | .0003                                                                  | .0005 | .0006 | .0008 | .0010 | .0012 | .0016 | .0020 | .0024 |
| Cast-Iron - Gray CG, ASTM A48, CLASS 20, 25, 30, 35, SAE J431C, GRADES G1800, G3000, G3500, GG 10, 15, 20, 25, 30, 35, 40               | K   | up to 240 HB | •                                                      | o | o | 375      | 350 | 325 | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0024 | .0031 | .0040 | .0050 |
| Cast Iron - Ductile & Malleable CGI 60-40-18, 65-45-12, D4018, D4512, D5506, 32510, 35108, M3210, M4504, M5503, 250, 300, 350, 400, 450 | K   | over 240 HB  | •                                                      | o | o | 275      | 260 | 250 | .0004                                                                  | .0010 | .0012 | .0016 | .0020 | .0024 | .0031 | .0040 | .0050 |

**Spindle Maximum** - Should the calculated spindle speed be more than your actual spindle maximum, use this formula:  
(Calculated Feed x Spindle Maximum)/Calculated Speed



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Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.



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