

# 2018 GENERAL PURPOSE CATALOG



Premium Solid Carbide & Cobalt HSS End Mills, Drills, & Cutting Tools

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# POWDERED METAL END MILLS

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# COBALT M42(8%) & HSS ROUGHING END MILLS

## Roughing End Mills



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## Roughing/ Finishing End Mills



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Fine Pitch Rougher Finisher w/35° Helix for Alum - 3 FL  
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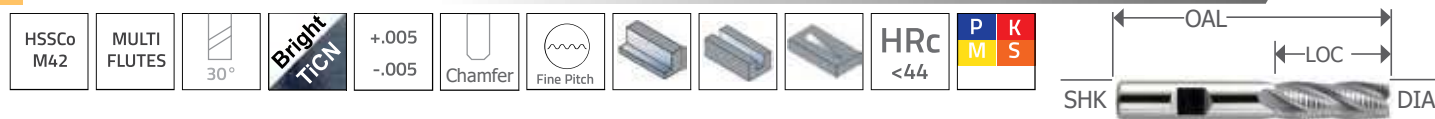
CC Rougher/Finisher - Multiple Flute  
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## MULTI FLUTE • FINE PITCH CENTER CUTTING ROUGHING END MILLS



### SERIES: CCFP

| DIA   | SHK   | LOC   | OAL     | FLUTE | LENGTH | TOOL        | BRIGHT EDP | TICN EDP |
|-------|-------|-------|---------|-------|--------|-------------|------------|----------|
| 3/16  | 3/8   | 1/2   | 2-3/8   | 4     | std    | CCFP-1206   | 17672      | 47672    |
| 1/4   | 3/8   | 5/8   | 2-7/16  | 4     | std    | CCFP-1208   | 17673      | 47673    |
| 1/4   | 3/8   | 1-1/8 | 3-1/16  | 4     | long   | CCFP-1208-L | 17674      | 47674    |
| 5/16  | 3/8   | 3/4   | 2-1/2   | 4     | std    | CCFP-1210   | 17675      | 47675    |
| 5/16  | 3/8   | 1-3/8 | 3-1/8   | 4     | long   | CCFP-1210-L | 17676      | 47676    |
| 3/8   | 3/8   | 3/8   | 2-1/8   | 4     | stub   | CCFPS-1212  | 16453      | 46453    |
| 3/8   | 3/8   | 3/4   | 2-1/2   | 4     | std    | CCFP-1212   | 17677      | 47677    |
| 3/8   | 3/8   | 1-1/2 | 3-1/4   | 4     | long   | CCFP-1212-L | 17678      | 47678    |
| 7/16  | 3/8   | 1     | 2-11/16 | 4     | std    | CCFP-1214   | 17679      | 47679    |
| 1/2   | 1/2   | 1/2   | 2-1/2   | 4     | stub   | CCFPS-1616  | 16454      | 46454    |
| 1/2   | 1/2   | 5/8   | 2-5/8   | 4     | stub   | CCFP-1616-2 | 17680      | 47680    |
| 1/2   | 1/2   | 1     | 3       | 4     | std    | CFPS-1616   | 15536      | 45536    |
| 1/2   | 1/2   | 1-1/4 | 3-1/4   | 4     | std    | CCFP-1616   | 17681      | 47681    |
| 1/2   | 1/2   | 1-5/8 | 3-5/8   | 4     | med    | CCFP-1616-M | 17682      | 47682    |
| 1/2   | 1/2   | 2     | 4       | 4     | long   | CCFP-1616-L | 16031      | 46031    |
| 1/2   | 1/2   | 2-1/2 | 4-1/2   | 4     | long   | CFP-1616-LL | 15682      | 45682    |
| 1/2   | 1/2   | 3     | 5       | 4     | xl     | CFP-1616-E  | 15684      | 45684    |
| 9/16  | 1/2   | 1-3/8 | 3-3/8   | 4     | std    | CFP-1618    | 15540      | 45540    |
| 5/8   | 5/8   | 5/8   | 2-3/4   | 4     | stub   | CCFPS-2020  | 16455      | 46455    |
| 5/8   | 5/8   | 3/4   | 2-7/8   | 4     | stub   | CFPS-2020   | 15544      | 45544    |
| 5/8   | 5/8   | 1-1/4 | 3-3/4   | 4     | std    | CFP-2020-2  | 15686      | 45686    |
| 5/8   | 5/8   | 1-5/8 | 3-3/4   | 4     | std    | CCFP-2020   | 17683      | 47683    |
| 5/8   | 5/8   | 2-1/8 | 4-1/4   | 4     | med    | CFP-2020-M  | 15688      | 45688    |
| 5/8   | 5/8   | 2-1/2 | 4-5/8   | 4     | long   | CCFP-2020-L | 16032      | 46032    |
| 5/8   | 5/8   | 3-1/8 | 5-1/4   | 4     | xl     | CFP-2020-E  | 15692      | 45692    |
| 3/4   | 5/8   | 1-5/8 | 3-3/4   | 4     | std    | CCFP-2024   | 17684      | 47684    |
| 3/4   | 3/4   | 3/4   | 3       | 4     | stub   | CCFPS-2424  | 16456      | 46456    |
| 3/4   | 3/4   | 1-5/8 | 3-7/8   | 4     | std    | CCFP-2424   | 17685      | 47685    |
| 3/4   | 3/4   | 2-1/4 | 4-1/2   | 4     | med    | CCFP-2424-M | 17686      | 47686    |
| 3/4   | 3/4   | 3     | 5-1/4   | 4     | long   | CCFP-2424-L | 16033      | 46033    |
| 7/8   | 3/4   | 1-7/8 | 4-1/8   | 5     | std    | CCFP-2428   | 12324      | 42324    |
| 1     | 3/4   | 2     | 4-1/4   | 5     | med    | CCFP-2432-M | 17687      | 47687    |
| 1     | 1     | 2     | 4-1/2   | 5     | std    | CCFP-3232   | 17688      | 47688    |
| 1     | 1     | 3     | 5-1/2   | 5     | med    | CCFP-3232-M | 17689      | 47689    |
| 1     | 1     | 4     | 6-1/2   | 5     | long   | CCFP-3232-L | 16034      | 46034    |
| 1-1/4 | 1-1/4 | 1-3/8 | 3-7/8   | 6     | stub   | CCFPS-4040  | 11319      | 41319    |
| 1-1/4 | 1-1/4 | 2     | 4-1/2   | 6     | std    | CCFP-4040   | 10733      | 40733    |
| 1-1/4 | 1-1/4 | 3     | 5-1/2   | 6     | med    | CCFP-4040-M | 16035      | 46035    |
| 1-1/4 | 1-1/4 | 4     | 6-1/2   | 6     | long   | CCFP-4040-L | 16036      | 46036    |
| 1-1/2 | 1-1/4 | 2     | 4-1/2   | 6     | std    | CCFP-4048   | 12568      | 42568    |
| 1-1/2 | 1-1/4 | 3     | 5-1/2   | 6     | med    | CCFP-4048-M | 12781      | 42781    |
| 1-1/2 | 1-1/4 | 4     | 6-1/2   | 6     | long   | CCFP-4048-L | 12323      | 42323    |

## MULTI FLUTE • FINE PITCH NON-CENTER CUTTING ROUGHING END MILLS



HSSCo  
M42

MULTI  
FLUTES

30°

Bright  
TICN

+0.005  
-0.005

Chamfer

Fine Pitch



HRC  
<44

P  
M  
K  
S

### SERIES: CFP

| DIA                                                                                   | SHK   | LOC   | OAL   | FLUTE | LENGTH | TOOL        | BRIGHT<br>EDP | TICN<br>EDP |
|---------------------------------------------------------------------------------------|-------|-------|-------|-------|--------|-------------|---------------|-------------|
| * All roughers 5/8 and under are only available center cutting. See table on page 134 |       |       |       |       |        |             |               |             |
| 11/16                                                                                 | 5/8   | 1-5/8 | 3-3/4 | 4     | std    | CFP-2022    | 15694         | 45694       |
| 3/4                                                                                   | 3/4   | 3/4   | 3     | 4     | stub   | CFPS-2424   | 15548         | 45548       |
| 3/4                                                                                   | 3/4   | 1-1/4 | 3-1/2 | 4     | std    | CFP-2424-2  | 15698         | 45698       |
| 3/4                                                                                   | 5/8   | 1-5/8 | 3-3/4 | 4     | std    | CFP-2024    | 15696         | 45696       |
| 3/4                                                                                   | 3/4   | 1-5/8 | 3-7/8 | 4     | std    | CFP-2424    | 15546         | 45546       |
| 3/4                                                                                   | 3/4   | 2-1/2 | 4-3/4 | 4     | med    | CFP-2424-M  | 15550         | 45550       |
| 3/4                                                                                   | 3/4   | 3     | 5-1/4 | 4     | long   | CFP-2424-L  | 15552         | 45552       |
| 3/4                                                                                   | 3/4   | 4-1/8 | 6-3/8 | 4     | xl     | CFP-2424-E  | 15700         | 45700       |
| 13/16                                                                                 | 3/4   | 1-7/8 | 4-1/8 | 5     | std    | CFP-2426    | 15702         | 45702       |
| 7/8                                                                                   | 3/4   | 1-1/8 | 3-3/8 | 5     | stub   | CFPS-2428   | 15706         | 45706       |
| 7/8                                                                                   | 3/4   | 1-7/8 | 4-1/8 | 5     | std    | CFP-2428    | 15704         | 45704       |
| 7/8                                                                                   | 7/8   | 1-7/8 | 4-1/8 | 5     | std    | CFP-2828    | 15738         | 45738       |
| 7/8                                                                                   | 3/4   | 3-1/2 | 5-3/4 | 5     | long   | CFP-2428-L  | 15708         | 45708       |
| 7/8                                                                                   | 7/8   | 3-1/2 | 5-3/4 | 5     | long   | CFP-2828-L  | 15740         | 45740       |
| 1                                                                                     | 3/4   | 1-1/8 | 3-3/8 | 5     | stub   | CFPS-2432   | 15554         | 45554       |
| 1                                                                                     | 1     | 1-1/8 | 3-5/8 | 5     | stub   | CFPS-3232-2 | 15742         | 45742       |
| 1                                                                                     | 3/4   | 1-1/2 | 3-3/4 | 5     | std    | CFP-2432    | 15794         | 45794       |
| 1                                                                                     | 1     | 1-5/8 | 4-1/8 | 5     | stub   | CFPS-3232   | 15560         | 45560       |
| 1                                                                                     | 3/4   | 2     | 4-1/4 | 5     | med    | CFP-2432-M  | 15556         | 45556       |
| 1                                                                                     | 1     | 2     | 4-1/2 | 5     | std    | CFP-3232    | 15558         | 45558       |
| 1                                                                                     | 1     | 3     | 5-1/2 | 5     | med    | CFP-3232-M  | 15562         | 45562       |
| 1                                                                                     | 3/4   | 4     | 6-1/4 | 5     | long   | CFP-2432-L  | 15710         | 45710       |
| 1                                                                                     | 1     | 4     | 6-1/2 | 5     | long   | CFP-3232-L  | 15744         | 45744       |
| 1                                                                                     | 1     | 6     | 8-1/2 | 5     | xl     | CFP-3232-E  | 15746         | 45746       |
| 1-1/8                                                                                 | 3/4   | 1-1/8 | 3-3/8 | 6     | stub   | CFPS-2436   | 15714         | 45714       |
| 1-1/8                                                                                 | 3/4   | 2     | 4-1/4 | 6     | std    | CFP-2436    | 15712         | 45712       |
| 1-1/8                                                                                 | 1     | 2     | 4-1/2 | 6     | std    | CFP-3236    | 15748         | 45748       |
| 1-1/8                                                                                 | 1     | 3-1/2 | 6     | 6     | long   | CFP-3236-L  | 15750         | 45750       |
| 1-1/4                                                                                 | 3/4   | 1-1/8 | 3-3/8 | 6     | stub   | CFPS-2440   | 15716         | 45716       |
| 1-1/4                                                                                 | 3/4   | 2     | 4-1/4 | 6     | med    | CFP-2440-M  | 15718         | 45718       |
| 1-1/4                                                                                 | 1-1/4 | 2     | 4-1/2 | 6     | std    | CFP-4040    | 15564         | 45564       |
| 1-1/4                                                                                 | 1-1/4 | 3     | 5-1/2 | 6     | med    | CFP-4040-M  | 15566         | 45566       |
| 1-1/4                                                                                 | 1-1/4 | 4     | 6-1/2 | 6     | long   | CFP-4040-L  | 15568         | 45568       |
| 1-1/4                                                                                 | 1-1/4 | 6     | 8-1/2 | 6     | xl     | CFP-4040-E  | 15570         | 45570       |
| 1-3/8                                                                                 | 3/4   | 1-1/8 | 3-3/8 | 6     | stub   | CFPS-2444   | 15722         | 45722       |
| 1-3/8                                                                                 | 3/4   | 2     | 4-1/4 | 6     | std    | CFP-2444    | 15720         | 45720       |
| 1-1/2                                                                                 | 3/4   | 1-1/8 | 3-3/8 | 6     | stub   | CFPS-2448   | 15728         | 45728       |
| 1-1/2                                                                                 | 3/4   | 1-1/2 | 3-3/4 | 6     | std    | CFP-2448    | 15724         | 45724       |
| 1-1/2                                                                                 | 3/4   | 2     | 4-1/4 | 6     | std    | CFP-2448-2  | 15726         | 45726       |
| 1-1/2                                                                                 | 1-1/4 | 2     | 4-1/2 | 6     | std    | CFP-4048    | 15752         | 45752       |
| 1-1/2                                                                                 | 1-1/4 | 3     | 5-1/2 | 6     | med    | CFP-4048-M  | 15754         | 45754       |
| 1-1/2                                                                                 | 1-1/4 | 4     | 6-1/2 | 6     | long   | CFP-4048-L  | 15756         | 45756       |
| 1-1/2                                                                                 | 1-1/4 | 6     | 8-1/2 | 6     | xl     | CFP-4048-E  | 15758         | 45758       |
| 1-3/4                                                                                 | 3/4   | 1-1/8 | 3-3/8 | 6     | stub   | CFPS-2456   | 15732         | 45732       |
| 1-3/4                                                                                 | 3/4   | 2     | 4-1/4 | 6     | std    | CFP-2456    | 15730         | 45730       |
| 2                                                                                     | 3/4   | 1-1/8 | 3-3/8 | 8     | stub   | CFPS-2464   | 15736         | 45736       |
| 2                                                                                     | 3/4   | 2     | 4-1/4 | 8     | std    | CFP-2464    | 15734         | 45734       |
| 2                                                                                     | 1-1/4 | 2     | 4-1/2 | 8     | std    | CFP-4064    | 15760         | 45760       |
| 2                                                                                     | 2     | 4     | 7-3/4 | 8     | med    | CFP-6464-M  | 15764         | 45764       |

## MULTI FLUTE • FINE PITCH CENTER CUTTING ROUGHING END MILLS



### SERIES: CCFP

| DIA  | SHK  | LOC  | OAL   | FLUTE | LENGTH | TOOL         | BRIGHT EDP | TICN EDP |
|------|------|------|-------|-------|--------|--------------|------------|----------|
| 6mm  | 6mm  | 13mm | 57mm  | 3     | std    | CCFP-M6M6    | 16391      | 46391    |
| 7mm  | 10mm | 16mm | 69mm  | 3     | std    | CCFP-M10M7   | 16392      | 46392    |
| 8mm  | 10mm | 19mm | 69mm  | 3     | std    | CCFP-M10M8   | 16393      | 46393    |
| 9mm  | 10mm | 19mm | 69mm  | 4     | std    | CCFP-M10M9   | 16394      | 46394    |
| 10mm | 10mm | 22mm | 72mm  | 4     | std    | CCFP-M10M10  | 16395      | 46395    |
| 11mm | 12mm | 22mm | 79mm  | 4     | std    | CCFP-M12M11  | 16396      | 46396    |
| 12mm | 12mm | 26mm | 83mm  | 4     | std    | CCFP-M12M12  | 16397      | 46397    |
| 13mm | 12mm | 26mm | 83mm  | 4     | std    | CCFP-M12M13  | 16398      | 46398    |
| 14mm | 12mm | 26mm | 83mm  | 4     | std    | CCFP-M12M14  | 16399      | 46399    |
| 15mm | 12mm | 26mm | 83mm  | 4     | std    | CCFP-M12M15  | 16400      | 46400    |
| 16mm | 16mm | 32mm | 92mm  | 4     | std    | CCFP-M16M16  | 16401      | 46401    |
| 18mm | 16mm | 32mm | 92mm  | 4     | std    | CCFP-M16M18  | 16402      | 46402    |
| 20mm | 20mm | 38mm | 104mm | 4     | std    | CCFP-M20M20  | 16403      | 46403    |
| 22mm | 20mm | 38mm | 104mm | 5     | std    | CCFP-M20M22  | 16404      | 46404    |
| 24mm | 25mm | 45mm | 121mm | 5     | std    | CCFP-M25M24  | 16405      | 46405    |
| 25mm | 25mm | 45mm | 121mm | 5     | std    | CCFP-M25M25  | 16406      | 46406    |
| 28mm | 25mm | 45mm | 121mm | 6     | std    | CCFP-M25M28* | 16407      | 46407    |
| 32mm | 32mm | 53mm | 133mm | 6     | std    | CCFP-M32M32* | 16409      | 46409    |

\*=Non-Centercutting

## MULTI FLUTE • FINE PITCH CENTER CUTTING BALL NOSE ROUGHING END MILLS



### SERIES: CCFP-\_\_-B

| DIA | SHK | LOC   | OAL    | FLUTE | LENGTH | TOOL        | BRIGHT EDP | TICN EDP |
|-----|-----|-------|--------|-------|--------|-------------|------------|----------|
| 1/4 | 3/8 | 5/8   | 2-7/16 | 4     | std    | CCFP-1208-B | 15840      | 45840    |
| 3/8 | 3/8 | 3/4   | 2-1/2  | 4     | std    | CCFP-1212-B | 15842      | 45842    |
| 1/2 | 1/2 | 1-1/4 | 3-1/4  | 4     | std    | CCFP-1616-B | 15844      | 45844    |
| 5/8 | 5/8 | 1-5/8 | 3-3/4  | 4     | std    | CCFP-2020-B | 15846      | 45846    |
| 3/4 | 3/4 | 1-5/8 | 3-7/8  | 4     | std    | CCFP-2424-B | 15848      | 45848    |
| 1   | 1   | 2     | 4-1/2  | 5     | std    | CCFP-3232-B | 15850      | 45850    |

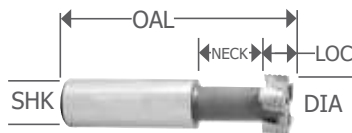
## MULTI FLUTE • COARSE PITCH NON-CENTER CUTTING ROUGHING END MILL



### SERIES: CR

| DIA   | SHK   | LOC   | OAL     | FLUTE | LENGTH | TOOL       | BRIGHT EDP | TICN EDP |
|-------|-------|-------|---------|-------|--------|------------|------------|----------|
| 3/8   | 3/8   | 3/4   | 2-1/2   | 4     | std    | CR-1212    | 16510      | 46510    |
| 3/8   | 3/8   | 1-1/2 | 3-1/4   | 4     | long   | CR-1212-L  | 16601      | 46601    |
| 7/16  | 3/8   | 1     | 2-11/16 | 4     | std    | CR-1214    | 16698      | 46698    |
| 1/2   | 1/2   | 1-1/4 | 3-1/4   | 4     | std    | CR-1616    | 16511      | 46511    |
| 1/2   | 1/2   | 1     | 3       | 4     | stub   | CRS-1616   | 16512      | 46512    |
| 1/2   | 1/2   | 2     | 4       | 4     | long   | CR-1616-L  | 16513      | 46513    |
| 5/8   | 5/8   | 1-5/8 | 3-3/4   | 4     | std    | CR-2020    | 16514      | 46514    |
| 5/8   | 5/8   | 2-1/2 | 4-5/8   | 4     | long   | CR-2020-L  | 16515      | 46515    |
| 3/4   | 5/8   | 1-5/8 | 3-3/4   | 4     | std    | CR-2024    | 16602      | 46602    |
| 3/4   | 3/4   | 1-5/8 | 3-7/8   | 4     | std    | CR-2424    | 16516      | 46516    |
| 3/4   | 3/4   | 3/4   | 3       | 4     | stub   | CRS-2424   | 16603      | 46603    |
| 3/4   | 3/4   | 3     | 5-1/4   | 4     | long   | CR-2424-L  | 16517      | 46517    |
| 7/8   | 3/4   | 1-1/8 | 3-3/8   | 5     | std    | CR-2428    | 16518      | 46518    |
| 7/8   | 3/4   | 3-1/2 | 5-3/4   | 5     | long   | CR-2428-L  | 16519      | 46519    |
| 1     | 3/4   | 1-1/2 | 3-3/4   | 5     | std    | CR-2432    | 16699      | 46699    |
| 1     | 3/4   | 1-1/8 | 3-3/8   | 5     | stub   | CRS-2432   | 16520      | 46520    |
| 1     | 3/4   | 1-7/8 | 4-1/8   | 5     | med    | CR-2432-M  | 16521      | 46521    |
| 1     | 3/4   | 4     | 6-1/4   | 5     | long   | CR-2432-L  | 16522      | 46522    |
| 1-1/8 | 3/4   | 1-1/8 | 3-3/8   | 6     | stub   | CRS-2436   | 16523      | 46523    |
| 1-1/4 | 3/4   | 1-1/2 | 3-3/4   | 6     | std    | CR-2440    | 16700      | 46700    |
| 1-1/4 | 3/4   | 1-1/8 | 3-3/8   | 6     | stub   | CRS-2440-2 | 16524      | 46524    |
| 1-1/4 | 3/4   | 2     | 4-1/2   | 6     | med    | CR-2440-M  | 16525      | 46525    |
| 1-1/2 | 3/4   | 1-1/2 | 3-3/4   | 6     | std    | CR-2448    | 16605      | 46605    |
| 1-1/2 | 3/4   | 2-1/4 | 4-1/2   | 6     | std    | CR-2448-2  | 16526      | 46526    |
| 1-1/2 | 3/4   | 1-1/8 | 3-3/8   | 6     | stub   | CRS-2448-2 | 16527      | 46527    |
| 2     | 3/4   | 1-1/8 | 3-3/8   | 8     | stub   | CRS-2464-2 | 16528      | 46528    |
| 1     | 1     | 2     | 4-1/2   | 5     | std    | CR-3232    | 16529      | 46529    |
| 1     | 1     | 3     | 5-1/2   | 5     | med    | CR-3232-M  | 16530      | 46530    |
| 1     | 1     | 4     | 6-1/2   | 5     | long   | CR-3232-L  | 16531      | 46531    |
| 1-1/8 | 1     | 2     | 4-1/2   | 6     | std    | CR-3236    | 16701      | 46701    |
| 1-1/4 | 1-1/4 | 2     | 4-1/2   | 6     | std    | CR-4040    | 16532      | 46532    |
| 1-1/4 | 1-1/4 | 3     | 5-1/2   | 6     | med    | CR-4040-M  | 16533      | 46533    |
| 1-1/4 | 1-1/4 | 4     | 6-1/2   | 6     | long   | CR-4040-L  | 16534      | 46534    |
| 1-1/2 | 1-1/4 | 2     | 4-1/2   | 6     | std    | CR-4048    | 16535      | 46535    |
| 1-1/2 | 1-1/4 | 3     | 5-1/2   | 6     | med    | CR-4048-M  | 16536      | 46536    |
| 1-1/2 | 1-1/4 | 4     | 6-1/2   | 6     | long   | CR-4048-L  | 16537      | 46537    |

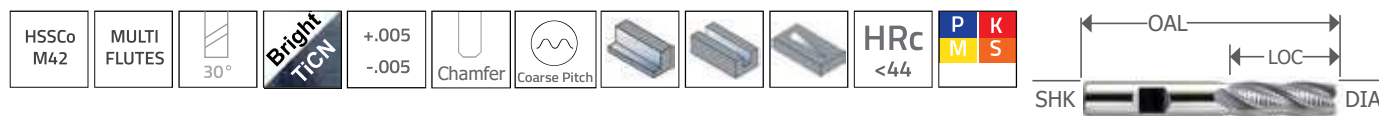
## MULTI FLUTE • COARSE PITCH T-SLOT ROUGHING END MILLS



### SERIES: CRPN

| DIA    | SHK   | LOC   | NECK  | OAL     | BOLT SIZE | FLUTE | LENGTH | TOOL      | BRIGHT EDP | TICN EDP |
|--------|-------|-------|-------|---------|-----------|-------|--------|-----------|------------|----------|
| 0.9588 | 3/4   | .3856 | 1.019 | 3-7/16  | 1/2       | 5     | std    | CRPN-2431 | 12757      | 42757    |
| 1.2400 | 1     | .4790 | 1.117 | 3-15/16 | 5/8       | 6     | std    | CRPN-3240 | 12759      | 42759    |
| 1.4590 | 1     | .6200 | 1.537 | 4-7/16  | 3/4       | 6     | std    | CRPN-3247 | 12761      | 42761    |
| 1.8338 | 1-1/4 | .8230 | 1.706 | 4-13/16 | 1         | 8     | std    | CRPN-4059 | 12763      | 42763    |
| 2.2090 | 1-1/4 | 1.088 | 2.006 | 5-3/8   | 1-1/4     | 8     | std    | CRPN-4071 | 12765      | 42765    |
| 2.6460 | 1-1/4 | 1.339 | 2.296 | 5-29/32 | 1-1/2     | 8     | std    | CRPN-4085 | 12767      | 42767    |

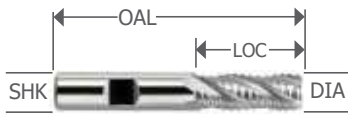
## MULTI FLUTE • COARSE PITCH CENTER CUTTING ROUGHING END MILL



### SERIES: CCRP

| DIA   | SHK   | LOC   | OAL     | FLUTE | LENGTH | TOOL        | BRIGHT EDP | TICN EDP |
|-------|-------|-------|---------|-------|--------|-------------|------------|----------|
| 3/16  | 3/8   | 1/2   | 2-3/8   | 4     | std    | CCRP-1206   | 15600      | 45600    |
| 1/4   | 3/8   | 5/8   | 2-7/16  | 4     | std    | CCRP-1208   | 15602      | 45602    |
| 1/4   | 3/8   | 1-1/8 | 3-1/16  | 4     | long   | CCRP-1208-L | 15604      | 45604    |
| 1/4   | 3/8   | 1-1/4 | 3-1/16  | 4     | long   | CRP-1208-LL | 15766      | 45766    |
| 5/16  | 3/8   | 3/4   | 2-1/2   | 4     | std    | CCRP-1210   | 15606      | 45606    |
| 5/16  | 3/8   | 1-3/8 | 3-1/8   | 4     | long   | CCRP-1210-L | 15608      | 45608    |
| 3/8   | 3/8   | 3/4   | 2-1/2   | 4     | std    | CCRP-1212   | 15610      | 45610    |
| 3/8   | 3/8   | 1-1/2 | 3-1/4   | 4     | long   | CCRP-1212-L | 15612      | 45612    |
| 7/16  | 3/8   | 1     | 2-11/16 | 4     | std    | CCRP-1214   | 15614      | 45614    |
| 1/2   | 1/2   | 5/8   | 2-5/8   | 4     | std    | CCRP-1616-2 | 15796      | 45796    |
| 1/2   | 1/2   | 1     | 3       | 4     | stub   | CCRPS-1616  | 15616      | 45616    |
| 1/2   | 1/2   | 1-1/4 | 3-1/4   | 4     | std    | CCRP-1616   | 12664      | 42664    |
| 1/2   | 1/2   | 1-5/8 | 3-5/8   | 4     | med    | CCRP-1616-M | 15618      | 45618    |
| 1/2   | 1/2   | 2     | 4       | 4     | long   | CCRP-1616-L | 12678      | 42678    |
| 9/16  | 1/2   | 1-3/8 | 3-3/8   | 4     | std    | CRP-1618    | 15584      | 45584    |
| 5/8   | 5/8   | 3/4   | 2-7/8   | 4     | stub   | CRPS-2020   | 15586      | 45586    |
| 5/8   | 5/8   | 1-5/8 | 3-3/4   | 4     | std    | CCRP-2020   | 12666      | 42666    |
| 5/8   | 5/8   | 2-1/2 | 4-5/8   | 4     | long   | CCRP-2020-L | 12680      | 42680    |
| 3/4   | 5/8   | 1-5/8 | 3-3/4   | 4     | std    | CCRP-2024   | 15620      | 45620    |
| 3/4   | 3/4   | 1-5/8 | 3-7/8   | 4     | std    | CCRP-2424   | 12668      | 42668    |
| 3/4   | 3/4   | 2-1/4 | 4-1/2   | 4     | med    | CCRP-2424-M | 15622      | 45622    |
| 3/4   | 3/4   | 3     | 5-1/4   | 4     | long   | CCRP-2424-L | 12682      | 42682    |
| 7/8   | 3/4   | 1-7/8 | 4-1/8   | 5     | std    | CCRP-2428   | 12451      | 42451    |
| 1     | 3/4   | 2     | 4-1/4   | 5     | med    | CCRP-2432-M | 15624      | 45624    |
| 1     | 1     | 2     | 4-1/2   | 5     | std    | CCRP-3232   | 12670      | 42670    |
| 1     | 1     | 3     | 5-1/2   | 5     | med    | CCRP-3232-M | 15626      | 45626    |
| 1     | 1     | 4     | 6-1/2   | 5     | long   | CCRP-3232-L | 12684      | 42684    |
| 1-1/4 | 3/4   | 2     | 4-1/4   | 6     | med    | CCRP-2440-M | 13055      | 43055    |
| 1-1/4 | 1-1/4 | 2     | 4-1/2   | 6     | std    | CCRP-4040   | 12672      | 42672    |
| 1-1/4 | 1-1/4 | 3     | 5-1/2   | 6     | med    | CCRP-4040-M | 12457      | 42457    |
| 1-1/4 | 1-1/4 | 4     | 6-1/2   | 6     | long   | CCRP-4040-L | 12686      | 42686    |
| 1-1/2 | 1-1/4 | 2     | 4-1/2   | 6     | std    | CCRP-4048   | 12674      | 42674    |
| 1-1/2 | 1-1/4 | 3     | 5-1/2   | 6     | med    | CCRP-4048-M | 12459      | 42459    |
| 1-1/2 | 1-1/4 | 4     | 6-1/2   | 6     | long   | CCRP-4048-L | 12688      | 42688    |

## MULTI FLUTE • COARSE PITCH NON-CENTER CUTTING ROUGHING END MILL



### SERIES: CRP

| DIA                                                                                   | SHK   | LOC   | OAL    | FLUTE | LENGTH | TOOL        | BRIGHT EDP | TICN EDP |
|---------------------------------------------------------------------------------------|-------|-------|--------|-------|--------|-------------|------------|----------|
| * All roughers 5/8 and under are only available center cutting. See table on page 138 |       |       |        |       |        |             |            |          |
| 11/16                                                                                 | 5/8   | 1-5/8 | 3-3/4  | 4     | std    | CRP-2022    | 15588      | 45588    |
| 3/4                                                                                   | 3/4   | 3/4   | 3      | 4     | stub   | CRPS-2424   | 12588      | 42588    |
| 3/4                                                                                   | 5/8   | 1-5/8 | 3-3/4  | 4     | std    | CRP-2024    | 12584      | 42584    |
| 3/4                                                                                   | 3/4   | 1-5/8 | 3-7/8  | 4     | std    | CRP-2424    | 12586      | 42586    |
| 3/4                                                                                   | 3/4   | 2-1/2 | 4-3/4  | 4     | med    | CRP-2424-M  | 15590      | 45590    |
| 3/4                                                                                   | 3/4   | 3     | 5-1/4  | 4     | long   | CRP-2424-L  | 12624      | 42624    |
| 13/16                                                                                 | 3/4   | 1-7/8 | 4-1/8  | 4     | std    | CRP-2426    | 15592      | 45592    |
| 7/8                                                                                   | 3/4   | 1-7/8 | 4-1/8  | 5     | std    | CRP-2428    | 12590      | 42590    |
| 7/8                                                                                   | 7/8   | 1-7/8 | 4-1/8  | 5     | std    | CRP-2828    | 12606      | 42606    |
| 7/8                                                                                   | 3/4   | 3-1/2 | 5-3/4  | 5     | long   | CRP-2428-L  | 12626      | 42626    |
| 7/8                                                                                   | 7/8   | 3-1/2 | 5-3/4  | 5     | long   | CRP-2828-L  | 12628      | 42628    |
| 1                                                                                     | 3/4   | 3/4   | 3      | 5     | stub   | CRPS-2432   | 12594      | 42594    |
| 1                                                                                     | 3/4   | 1-1/2 | 3-3/4  | 5     | std    | CRP-2432    | 12592      | 42592    |
| 1                                                                                     | 1     | 1-5/8 | 4-1/8  | 5     | stub   | CRPS-3232   | 15598      | 45598    |
| 1                                                                                     | 3/4   | 2     | 4-1/4  | 5     | med    | CRP-2432-M  | 15594      | 45594    |
| 1                                                                                     | 1     | 2     | 4-1/2  | 5     | std    | CRP-3232    | 12608      | 42608    |
| 1                                                                                     | 1     | 3     | 5-1/2  | 5     | med    | CRP-3232-M  | 12630      | 42630    |
| 1                                                                                     | 1     | 4     | 6-1/2  | 5     | long   | CRP-3232-L  | 12632      | 42632    |
| 1                                                                                     | 1     | 6     | 8-1/2  | 5     | xl     | CRP-3232-E  | 12634      | 42634    |
| 1-1/8                                                                                 | 1     | 2     | 4-1/2  | 6     | std    | CRP-3236    | 12610      | 42610    |
| 1-1/4                                                                                 | 3/4   | 3/4   | 3      | 6     | stub   | CRPS-2440   | 12598      | 42598    |
| 1-1/4                                                                                 | 3/4   | 1-1/2 | 3-3/4  | 6     | std    | CRP-2440    | 12596      | 42596    |
| 1-1/4                                                                                 | 3/4   | 2     | 4-1/2  | 6     | med    | CRP-2440-M  | 15596      | 45596    |
| 1-1/4                                                                                 | 1-1/4 | 2     | 4-1/2  | 6     | std    | CRP-4040    | 12612      | 42612    |
| 1-1/4                                                                                 | 1-1/4 | 3     | 5-1/2  | 6     | med    | CRP-4040-M  | 12636      | 42636    |
| 1-1/4                                                                                 | 1-1/4 | 4     | 6-1/2  | 6     | long   | CRP-4040-L  | 12638      | 42638    |
| 1-1/4                                                                                 | 1-1/4 | 6     | 8-1/2  | 6     | xl     | CRP-4040-E  | 12640      | 42640    |
| 1-1/2                                                                                 | 3/4   | 3/4   | 3      | 6     | stub   | CRPS-2448   | 12602      | 42602    |
| 1-1/2                                                                                 | 3/4   | 1-1/2 | 3-3/4  | 6     | std    | CRP-2448    | 12600      | 42600    |
| 1-1/2                                                                                 | 1-1/4 | 2     | 4-1/2  | 6     | std    | CRP-4048    | 12614      | 42614    |
| 1-1/2                                                                                 | 1-1/4 | 3     | 5-1/2  | 6     | med    | CRP-4048-M  | 12642      | 42642    |
| 1-1/2                                                                                 | 1-1/4 | 4     | 6-1/2  | 6     | long   | CRP-4048-L  | 12644      | 42644    |
| 1-1/2                                                                                 | 1-1/4 | 5     | 7-1/2  | 6     | xl     | CRP-4048-E  | 12646      | 42646    |
| 1-1/2                                                                                 | 1-1/4 | 8     | 10-1/2 | 6     | xxl    | CRP-4048-EE | 12648      | 42648    |
| 1-3/4                                                                                 | 1-1/4 | 2-1/2 | 5-1/4  | 6     | std    | CRP-4056    | 12616      | 42616    |
| 1-3/4                                                                                 | 1-1/4 | 4     | 6-1/2  | 6     | long   | CRP-4056-L  | 12650      | 42650    |
| 2                                                                                     | 3/4   | 3/4   | 3      | 8     | stub   | CRPS-2464   | 12604      | 42604    |
| 2                                                                                     | 1-1/4 | 2     | 4-1/2  | 8     | std    | CRP-4064    | 12618      | 42618    |
| 2                                                                                     | 2     | 4     | 7-3/4  | 8     | med    | CRP-6464-M  | 15882      | 45882    |
| 2                                                                                     | 2     | 6     | 9-3/4  | 8     | long   | CRP-6464-L  | 12658      | 42658    |

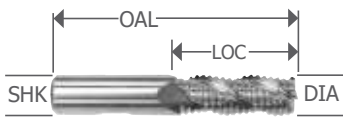
## 3 FLUTE • FINE PITCH ROUGHERS WITH 35° HIGH HELIX FOR ALUMINUM



### SERIES: EFP

| DIA  | SHK | LOC   | OAL    | LENGTH | TOOL               | BRIGHT<br>EDP | TICN<br>EDP |
|------|-----|-------|--------|--------|--------------------|---------------|-------------|
| 1/4  | 3/8 | 1/4   | 2-1/8  | stub   | <b>EFPS-1208</b>   | 15784         | 45784       |
| 1/4  | 3/8 | 5/8   | 2-1/2  | std    | <b>EFP-1208</b>    | 15786         | 45786       |
| 5/16 | 3/8 | 3/4   | 2-1/2  | std    | <b>EFP-1210</b>    | 10993         | 40993       |
| 3/8  | 3/8 | 3/8   | 2-1/8  | stub   | <b>EFPS-1212</b>   | 15788         | 45788       |
| 3/8  | 3/8 | 3/4   | 2-1/2  | std    | <b>EFP-1212</b>    | 15884         | 45884       |
| 1/2  | 1/2 | 1/2   | 2-9/16 | stub   | <b>EFPS-1616-2</b> | 15790         | 45790       |
| 1/2  | 1/2 | 1-1/4 | 3-1/4  | std    | <b>EFP-1616</b>    | 15886         | 45886       |
| 1/2  | 1/2 | 2     | 4      | long   | <b>EFP-1616-L</b>  | 16458         | 46458       |
| 5/8  | 5/8 | 1-5/8 | 3-3/4  | std    | <b>EFP-2020</b>    | 15888         | 45888       |
| 3/4  | 3/4 | 3/4   | 3      | stub   | <b>EFPS-2424</b>   | 15792         | 45792       |
| 3/4  | 3/4 | 1-5/8 | 3-7/8  | std    | <b>EFP-2424</b>    | 15890         | 45890       |
| 3/4  | 3/4 | 2-1/4 | 4-1/2  | med    | <b>EFP-2424-M</b>  | 10268         | 40268       |
| 3/4  | 3/4 | 3     | 5-1/4  | long   | <b>EFP-2424-L</b>  | 16460         | 46460       |
| 1    | 1   | 2     | 4-1/2  | std    | <b>EFP-3232</b>    | 15892         | 45892       |

## 3 FLUTE • COARSE PITCH ROUGHERS WITH 35° HIGH HELIX FOR ALUMINUM



### SERIES: ERP

| DIA  | SHK | LOC   | OAL     | LENGTH | TOOL        | BRIGHT EDP | TICN EDP |
|------|-----|-------|---------|--------|-------------|------------|----------|
| 3/16 | 3/8 | 1/2   | 2-3/8   | std    | ERP-1206    | 15628      | 45628    |
| 1/4  | 3/8 | 5/8   | 2-7/16  | std    | ERP-1208    | 15630      | 45630    |
| 1/4  | 3/8 | 1-1/8 | 2-15/16 | long   | ERP-1208-L  | 15632      | 45632    |
| 5/16 | 3/8 | 3/4   | 2-1/2   | std    | ERP-1210    | 15634      | 45634    |
| 5/16 | 3/8 | 1-3/8 | 3-1/8   | long   | ERP-1210-L  | 15636      | 45636    |
| 3/8  | 3/8 | 3/4   | 2-1/2   | std    | ERP-1212    | 15638      | 45638    |
| 3/8  | 3/8 | 1-1/2 | 3-1/4   | long   | ERP-1212-L  | 15640      | 45640    |
| 7/16 | 3/8 | 1     | 2-11/16 | std    | ERP-1214    | 15642      | 45642    |
| 1/2  | 1/2 | 1/2   | 2-9/16  | stub   | ERPS-1616-2 | 15780      | 45780    |
| 1/2  | 1/2 | 1     | 3       | stub   | ERPS-1616   | 15646      | 45646    |
| 1/2  | 1/2 | 1-1/4 | 3-1/4   | std    | ERP-1616    | 15644      | 45644    |
| 1/2  | 1/2 | 1-5/8 | 3-5/8   | med    | ERP-1616-M  | 15648      | 45648    |
| 1/2  | 1/2 | 2     | 4       | long   | ERP-1616-L  | 15650      | 45650    |
| 5/8  | 5/8 | 3/4   | 2-7/8   | stub   | ERPS-2020   | 15654      | 45654    |
| 5/8  | 5/8 | 1-5/8 | 3-3/4   | std    | ERP-2020    | 15652      | 45652    |
| 5/8  | 5/8 | 2-1/2 | 4-5/8   | long   | ERP-2020-L  | 15656      | 45656    |
| 3/4  | 3/4 | 3/4   | 3       | stub   | ERPS-2424   | 15660      | 45660    |
| 3/4  | 3/4 | 1-5/8 | 3-7/8   | std    | ERP-2424    | 15658      | 45658    |
| 3/4  | 3/4 | 2     | 4-1/4   | std    | ERP-2424-2  | 15798      | 45798    |
| 3/4  | 3/4 | 2-1/2 | 4-3/4   | med    | ERP-2424-M  | 15662      | 45662    |
| 3/4  | 3/4 | 3     | 5-1/4   | long   | ERP-2424-L  | 15664      | 45664    |
| 1    | 3/4 | 1-1/8 | 3-3/8   | stub   | ERPS-2432   | 15782      | 45782    |
| 1    | 3/4 | 1-1/2 | 3-3/4   | std    | ERP-2432    | 15778      | 45778    |
| 1    | 1   | 2     | 4-1/2   | std    | ERP-3232    | 15666      | 45666    |
| 1    | 1   | 3     | 5-1/2   | med    | ERP-3232-M  | 15668      | 45668    |
| 1    | 1   | 4     | 6-1/2   | long   | ERP-3232-L  | 13089      | 43089    |

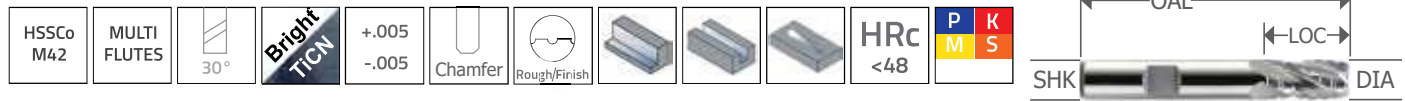
## 3 FLUTE • FINE PITCH ROUGHER/FINISHERS WITH 35° HIGH HELIX FOR ALUMINUM



### SERIES: ERFP

| DIA  | SHK | LOC   | OAL    | LENGTH | TOOL      | BRIGHT EDP | TICN EDP |
|------|-----|-------|--------|--------|-----------|------------|----------|
| 3/16 | 3/8 | 1/2   | 2-3/8  | std    | ERFP-1206 | 17691      | 47691    |
| 1/4  | 3/8 | 5/8   | 2-7/16 | std    | ERFP-1208 | 17692      | 47692    |
| 3/8  | 3/8 | 3/4   | 2-1/2  | std    | ERFP-1212 | 17693      | 47693    |
| 1/2  | 1/2 | 1-1/4 | 3-1/4  | std    | ERFP-1616 | 17694      | 47694    |
| 5/8  | 5/8 | 1-5/8 | 3-3/4  | std    | ERFP-2020 | 16711      | 46711    |
| 3/4  | 3/4 | 1-5/8 | 3-7/8  | std    | ERFP-2424 | 17695      | 47695    |
| 1    | 1   | 2     | 4-1/2  | std    | ERFP-3232 | 17696      | 47696    |

## MULTI FLUTE • CENTER CUTTING ROUGHER/FINISHER



### SERIES: CCRFP

| DIA   | SHK   | LOC   | OAL     | FLUTE | LENGTH | TOOL         | BRIGHT EDP | TICN EDP |
|-------|-------|-------|---------|-------|--------|--------------|------------|----------|
| 3/16  | 3/8   | 1/2   | 2-3/8   | 4     | std    | CCRFP-1206   | 13101      | 43101    |
| 1/4   | 3/8   | 5/8   | 2-7/16  | 4     | std    | CCRFP-1208   | 13103      | 43103    |
| 5/16  | 3/8   | 3/4   | 2-1/2   | 4     | std    | CCRFP-1210   | 11907      | 41907    |
| 5/16  | 3/8   | 1-3/8 | 3-1/8   | 4     | long   | CCRFP-1210-L | 11839      | 41839    |
| 3/8   | 3/8   | 3/4   | 2-1/2   | 4     | std    | CCRFP-1212   | 11841      | 41841    |
| 7/16  | 3/8   | 1     | 2-11/16 | 4     | std    | CCRFP-1214   | 12281      | 42281    |
| 1/2   | 1/2   | 1     | 3       | 4     | stub   | CRFPS-1616   | 15510      | 45510    |
| 1/2   | 1/2   | 1-1/4 | 3-1/4   | 4     | std    | CCRFP-1616   | 11873      | 41873    |
| 1/2   | 1/2   | 1-5/8 | 3-5/8   | 4     | med    | CRFP-1616-M  | 15512      | 45512    |
| 1/2   | 1/2   | 2     | 4       | 4     | long   | CCRFP-1616-L | 12236      | 42236    |
| 1/2   | 1/2   | 3     | 5       | 4     | xl     | CCRFP-1616-E | 11843      | 41843    |
| 9/16  | 1/2   | 1-3/8 | 3-3/8   | 4     | std    | CCRFP-1618   | 11875      | 41875    |
| 5/8   | 5/8   | 1-1/4 | 3-3/4   | 4     | std    | CRFP-2020-2  | 11255      | 41255    |
| 5/8   | 5/8   | 1-5/8 | 3-3/4   | 4     | std    | CCRFP-2020   | 11877      | 41877    |
| 5/8   | 5/8   | 2-1/2 | 4-5/8   | 4     | long   | CCRFP-2020-L | 11879      | 41879    |
| 11/16 | 5/8   | 1-5/8 | 3-3/4   | 4     | std    | CCRFP-2022   | 11845      | 41845    |
| 3/4   | 5/8   | 1-5/8 | 3-3/4   | 4     | std    | CCRFP-2024   | 11847      | 41847    |
| 3/4   | 3/4   | 1-5/8 | 3-7/8   | 4     | std    | CCRFP-2424   | 11849      | 41849    |
| 3/4   | 3/4   | 3     | 5-1/4   | 4     | long   | CCRFP-2424-L | 11851      | 41851    |
| 3/4   | 3/4   | 4-1/8 | 6-3/8   | 4     | xl     | CCRFP-2424-E | 11853      | 41853    |
| 13/16 | 3/4   | 1-7/8 | 4-1/8   | 5     | std    | CCRFP-2426   | 11855      | 41855    |
| 7/8   | 3/4   | 1-7/8 | 4-1/8   | 5     | std    | CCRFP-2428   | 11857      | 41857    |
| 1     | 3/4   | 2     | 4-1/4   | 5     | med    | CCRFP-2432-M | 12539      | 42539    |
| 1-1/8 | 3/4   | 2     | 4-1/4   | 6     | std    | CCRFP-2436   | 11913      | 41913    |
| 1-1/2 | 3/4   | 2     | 4-1/4   | 6     | std    | CCRFP-2448   | 11911      | 41911    |
| 1     | 1     | 2     | 4-1/2   | 5     | std    | CCRFP-3232   | 11861      | 41861    |
| 1     | 1     | 3     | 5-1/2   | 5     | med    | CCRFP-3232-M | 11865      | 41865    |
| 1     | 1     | 4     | 6-1/2   | 5     | long   | CCRFP-3232-L | 11863      | 41863    |
| 1     | 1     | 6     | 8-1/2   | 5     | xl     | CCRFP-3232-E | 11909      | 41909    |
| 1-1/4 | 3/4   | 2     | 4-1/2   | 6     | med    | CCRFP-2440-M | 10987      | 40987    |
| 1-1/4 | 1-1/4 | 2     | 4-1/2   | 6     | std    | CCRFP-4040   | 13053      | 43053    |
| 1-1/4 | 1-1/4 | 3     | 5-1/2   | 6     | med    | CCRFP-4040-M | 12891      | 42891    |
| 1-1/4 | 1-1/4 | 4     | 6-1/2   | 6     | long   | CCRFP-4040-L | 12331      | 42331    |
| 1-1/4 | 1-1/4 | 6     | 8-1/2   | 6     | xl     | CCRFP-4040-E | 11867      | 41867    |
| 1-1/2 | 1-1/4 | 2     | 4-1/2   | 6     | std    | CCRFP-4048   | 11869      | 41869    |
| 1-1/2 | 1-1/4 | 3     | 5-1/2   | 6     | med    | CCRFP-4048-M | 10262      | 40262    |
| 1-1/2 | 1-1/4 | 4     | 6-1/2   | 6     | long   | CCRFP-4048-L | 11915      | 41915    |
| 1-1/2 | 1-1/4 | 6     | 8-1/2   | 6     | xl     | CCRFP-4048-E | 12332      | 42332    |

# COBALT & HSS ROUGHING END MILLS

## MULTI FLUTE • NON-CENTER CUTTING ROUGHER/FINISHER



HSSCo  
M42

MULTI  
FLUTES

Non-  
Center  
Cutting

30°

Bright  
TiCN

+0.005  
-0.005

Chamfer

Rough/Finish

HRC  
<48

P  
M

K  
S

### SERIES: CRFP

| DIA                                                                                            | SHK   | LOC   | OAL   | FLUTE | LENGTH | TOOL        | BRIGHT<br>EDP | TICN<br>EDP |
|------------------------------------------------------------------------------------------------|-------|-------|-------|-------|--------|-------------|---------------|-------------|
| * All rougher/finishers 5/8 and under are only available center cutting. See table on page 144 |       |       |       |       |        |             |               |             |
| 3/4                                                                                            | 3/4   | 3/4   | 3     | 4     | stub   | CRFPS-2424  | 11259         | 41259       |
| 3/4                                                                                            | 3/4   | 1-1/4 | 3-1/2 | 4     | std    | CRFP-2424-2 | 11257         | 41257       |
| 3/4                                                                                            | 3/4   | 1-5/8 | 3-7/8 | 4     | std    | CRFP-2424   | 15514         | 45514       |
| 3/4                                                                                            | 3/4   | 2-1/2 | 4-3/4 | 4     | med    | CRFP-2424-M | 15516         | 45516       |
| 3/4                                                                                            | 3/4   | 3     | 5-1/4 | 4     | long   | CRFP-2424-L | 15518         | 45518       |
| 1                                                                                              | 3/4   | 2     | 4-1/4 | 5     | med    | CRFP-2432-M | 11261         | 41261       |
| 1                                                                                              | 1     | 2     | 4-1/2 | 5     | std    | CRFP-3232   | 15520         | 45520       |
| 1                                                                                              | 1     | 3     | 5-1/2 | 5     | med    | CRFP-3232-M | 15522         | 45522       |
| 1                                                                                              | 1     | 4     | 6-1/2 | 5     | long   | CRFP-3232-L | 11263         | 41263       |
| 1-1/4                                                                                          | 1-1/4 | 6     | 8-1/2 | 6     | xl     | CRFP-4040-E | 11265         | 41265       |