

**Series US220 - Aluminum Alloys & Non-Ferrous Materials**

| Material Designation |                             | SFM<br>[ft/min] | ae max<br>[inch] | ap max<br>[inch] | Chip Load Per Tooth [inch] |                        |               |              |        |        |
|----------------------|-----------------------------|-----------------|------------------|------------------|----------------------------|------------------------|---------------|--------------|--------|--------|
|                      |                             |                 |                  |                  | 1/8"                       | 3/16"<br>1/4"<br>5/16" | 3/8"<br>7/16" | 1/2"<br>5/8" | 3/4"   | 1"     |
| Aluminium            | Non-Alloy                   | 1968            | 1xø              | 1xø              | 0.0016                     | 0.0024                 | 0.0031        | 0.0059       | 0.0079 | 0.0089 |
|                      | Wrought Alloy Non-Hardened  | 1968            | 1xø              | 1xø              | 0.0016                     | 0.0024                 | 0.0031        | 0.0059       | 0.0079 | 0.0089 |
|                      | Wrought Alloy Hardened      | 1968            | 1xø              | 1xø              | 0.0016                     | 0.0024                 | 0.0031        | 0.0059       | 0.0079 | 0.0089 |
|                      | Casting Alloy < 6% Si       | 1575            | 1xø              | 1xø              | 0.0016                     | 0.0024                 | 0.0031        | 0.0059       | 0.0079 | 0.0089 |
|                      | Casting Alloy 6-12% Si      | 1181            | 1xø              | 1xø              | 0.0012                     | 0.0020                 | 0.0028        | 0.0047       | 0.0067 | 0.0083 |
|                      | Casting Alloy > 6% Si       | 787             | 1xø              | 1xø              | 0.0012                     | 0.0020                 | 0.0028        | 0.0047       | 0.0067 | 0.0083 |
| Magnesium            | Wrought Alloy               | 722             | 1xø              | 1xø              | 0.0012                     | 0.0020                 | 0.0028        | 0.0047       | 0.0067 | 0.0083 |
|                      | Casting Alloy               | 656             | 1xø              | 1xø              | 0.0012                     | 0.0020                 | 0.0028        | 0.0047       | 0.0067 | 0.0083 |
| Copper               | Non-Alloy                   | 558             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | Wrought Alloy Non-Hardened  | 509             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | Wrought Alloy Hardened      | 394             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | CuNi-Alloy                  | 492             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | CuNiZn-Alloy Long-Chipping  | 394             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | CuNiZn-Alloy Short-Chipping | 492             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
| CuZn (Brass)         | Long-Chipping               | 591             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | Short-Chipping              | 787             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
| CuSn (Bronze)        | Long-Chipping               | 492             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | Short-Chipping              | 558             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
| CuAlFe (Ampco)       | Long-Chipping               | 180             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | Short-Chipping              | 230             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |

**Series US362 - Aluminum Alloys & Non-Ferrous Materials**

| Material Designation |                             | SFM<br>[ft/min] | ae max<br>[inch] | ap max<br>[inch] | Chip Load Per Tooth [inch] |                        |               |              |        |        |
|----------------------|-----------------------------|-----------------|------------------|------------------|----------------------------|------------------------|---------------|--------------|--------|--------|
|                      |                             |                 |                  |                  | 1/8"                       | 3/16"<br>1/4"<br>5/16" | 3/8"<br>7/16" | 1/2"<br>5/8" | 3/4"   | 1"     |
| Aluminium            | Non-Alloy                   | 1968            | 1xø              | 1xø              | 0.0014                     | 0.0024                 | 0.0028        | 0.0035       | 0.0047 | 0.0055 |
|                      | Wrought Alloy Non-Hardened  | 1968            | 1xø              | 1xø              | 0.0014                     | 0.0024                 | 0.0028        | 0.0035       | 0.0047 | 0.0055 |
|                      | Wrought Alloy Hardened      | 1968            | 1xø              | 1xø              | 0.0014                     | 0.0024                 | 0.0028        | 0.0035       | 0.0047 | 0.0055 |
|                      | Casting Alloy < 6% Si       | 1575            | 1xø              | 1xø              | 0.0014                     | 0.0024                 | 0.0028        | 0.0035       | 0.0047 | 0.0055 |
|                      | Casting Alloy 6-12% Si      | 1181            | 1xø              | 1xø              | 0.0012                     | 0.0020                 | 0.0028        | 0.0047       | 0.0067 | 0.0083 |
|                      | Casting Alloy > 6% Si       | 787             | 1xø              | 1xø              | 0.0012                     | 0.0020                 | 0.0028        | 0.0047       | 0.0067 | 0.0083 |
| Magnesium            | Wrought Alloy               | 722             | 1xø              | 1xø              | 0.0012                     | 0.0020                 | 0.0028        | 0.0047       | 0.0067 | 0.0083 |
|                      | Casting Alloy               | 656             | 1xø              | 1xø              | 0.0012                     | 0.0020                 | 0.0028        | 0.0047       | 0.0067 | 0.0083 |
| Copper               | Non-Alloy                   | 558             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | Wrought Alloy Non-Hardened  | 509             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | Wrought Alloy Hardened      | 394             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | CuNi-Alloy                  | 492             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | CuNiZn-Alloy Long-Chipping  | 394             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | CuNiZn-Alloy Short-Chipping | 492             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
| CuZn (Brass)         | Long-Chipping               | 591             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | Short-Chipping              | 787             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
| CuSn (Bronze)        | Long-Chipping               | 492             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | Short-Chipping              | 558             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
| CuAlFe (Ampco)       | Long-Chipping               | 180             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |
|                      | Short-Chipping              | 230             | 1xø              | 1xø              | 0.0008                     | 0.0016                 | 0.0024        | 0.0031       | 0.0047 | 0.0055 |

**Series 109 - Aluminum Alloys & Non-Ferrous Materials**

| Material Designation |                            | SFM<br>[ft/min] | ae max.<br>[inch] | ap max<br>[inch] | Chip Load Per Tooth [inch] |                        |               |              |        |        |
|----------------------|----------------------------|-----------------|-------------------|------------------|----------------------------|------------------------|---------------|--------------|--------|--------|
|                      |                            |                 |                   |                  | 1/8"                       | 3/16"<br>1/4"<br>5/16" | 3/8"<br>7/16" | 1/2"<br>5/8" | 3/4"   | 1"     |
| Aluminium            | Non-Alloy                  | 1230            | 0.05xø            | 1.4xø            | 0.0008                     | 0.0016                 | 0.002         | 0.0041       | 0.0048 | 0.0055 |
|                      | Wrought Alloy Non-Hardened | 1230            | 0.05xø            | 1.4xø            | 0.0008                     | 0.0016                 | 0.002         | 0.0041       | 0.0048 | 0.0055 |
|                      | Wrought Alloy Hardened     | 1230            | 0.05xø            | 1.4xø            | 0.0008                     | 0.0016                 | 0.002         | 0.0041       | 0.0048 | 0.0055 |
|                      | Casting Alloy < 6% Si      | 984             | 0.05xø            | 1.4xø            | 0.0008                     | 0.0016                 | 0.002         | 0.0041       | 0.0048 | 0.0055 |
|                      | Casting Alloy 6-12% Si     | 738             | 0.05xø            | 1.4xø            | 0.0006                     | 0.0008                 | 0.0012        | 0.0034       | 0.0041 | 0.0048 |
|                      | Casting Alloy > 6% Si      | 517             | 0.05xø            | 1.4xø            | 0.0006                     | 0.0008                 | 0.0012        | 0.0034       | 0.0041 | 0.0048 |
| Magnesium            | Wrought Alloy              | 492             | 0.05xø            | 1.4xø            | 0.0006                     | 0.0008                 | 0.0012        | 0.0034       | 0.0041 | 0.0048 |
|                      | Casting Alloy              | 418             | 0.05xø            | 1.4xø            | 0.0006                     | 0.0008                 | 0.0012        | 0.0034       | 0.0041 | 0.0048 |

\* Feeds and Speeds are starting points for Overall Lengths of 4" and shorter.  
 For End Mills with Overall Lengths over 4" decrease the Feeds and Speeds.