

KENNAMETAL®

HARVI™ IV

8-Flute End Mills

Durable, high performance
solid end milling solutions

HARVI IV

8-Flute End Mills

The latest addition to Kennametal's HARVI family of high-performance and versatile end mills

With a unique design that offers higher metal removal rates and feed rates than 7-flute end mills and more versatility than traditional 9-flute end mills, HARVI IV 8-Flute End Mills keep you cutting in difficult-to-machine materials. Rough and finish with one reliable tool in high-temp alloys, stainless steels, steels and hardened materials while achieving powerful chip evacuation from internal coolant channels.

Diameter range 3/8-1", 10-25mm

Length range 1.2-4.3xD

Internal through coolant

Chip splitters featured on versions greater than 2xD length of cut

The incredibly versatile HARVI IV 8-Flute End Mills are complemented by our new stainless steels, titanium and other high-temp alloys solid end milling grade KCSM15A. This new grade features an innovative coating technology that's delivering extended tool life for users and the best wear resistance in Kennametal's history of solid carbide end milling.



Industries



Aerospace



Medical

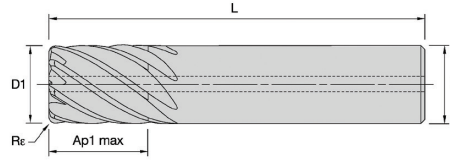


General Engineering



Wind & Solar

METRIC



- Primary
- Secondary

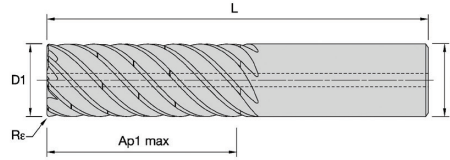
| | | |
|---|--|---|
| P | | ○ |
| M | | ● |
| K | | ○ |
| N | | ○ |
| S | | ● |
| H | | ○ |

HARVI™ IV

Radiused • 8 Flutes • Internal Coolant • Plain Shank • **METRIC**

KCSM15A

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | Re | |
|---------|-------------------------|-------------------------|-------|-------|---------|--------|-----|---|
| Metric | 7104182 | HA4R8RA1000R022HAR050IM | 10,00 | 10,00 | 22,00 | 72,00 | 0.5 | ● |
| | 7104183 | HA4R8RA1000R022HAR100IM | 10,00 | 10,00 | 22,00 | 72,00 | 1.0 | ● |
| | 7104184 | HA4R8RA1000R022HAR200IM | 10,00 | 10,00 | 22,00 | 72,00 | 2.0 | ● |
| | 7104185 | HA4R8RA1000R022HAR250IM | 10,00 | 10,00 | 22,00 | 72,00 | 2.5 | ● |
| | 7104186 | HA4R8RA1000R022HAR300IM | 10,00 | 10,00 | 22,00 | 72,00 | 3.0 | ● |
| | 7104188 | HA4R8RA1200R026HAR050IM | 12,00 | 12,00 | 26,00 | 83,00 | 0.5 | ● |
| | 7104189 | HA4R8RA1200R026HAR100IM | 12,00 | 12,00 | 26,00 | 83,00 | 1.0 | ● |
| | 7104190 | HA4R8RA1200R026HAR200IM | 12,00 | 12,00 | 26,00 | 83,00 | 2.0 | ● |
| | 7104191 | HA4R8RA1200R026HAR250IM | 12,00 | 12,00 | 26,00 | 83,00 | 2.5 | ● |
| | 7104192 | HA4R8RA1200R026HAR300IM | 12,00 | 12,00 | 26,00 | 83,00 | 3.0 | ● |
| | 7104194 | HA4R8RA1600R032HAR050IM | 16,00 | 16,00 | 32,00 | 92,00 | 0.5 | ● |
| | 7104195 | HA4R8RA1600R032HAR100IM | 16,00 | 16,00 | 32,00 | 92,00 | 1.0 | ● |
| | 7104196 | HA4R8RA1600R032HAR200IM | 16,00 | 16,00 | 32,00 | 92,00 | 2.0 | ● |
| | 7104197 | HA4R8RA1600R032HAR250IM | 16,00 | 16,00 | 32,00 | 92,00 | 2.5 | ● |
| | 7104198 | HA4R8RA1600R032HAR300IM | 16,00 | 16,00 | 32,00 | 92,00 | 3.0 | ● |
| | 7104199 | HA4R8RA1600R032HAR400IM | 16,00 | 16,00 | 32,00 | 92,00 | 4.0 | ● |
| | 7104201 | HA4R8RA2000R038HAR050IM | 20,00 | 20,00 | 38,00 | 104,00 | 0.5 | ● |
| | 7104202 | HA4R8RA2000R038HAR100IM | 20,00 | 20,00 | 38,00 | 104,00 | 1.0 | ● |
| | 7104203 | HA4R8RA2000R038HAR200IM | 20,00 | 20,00 | 38,00 | 104,00 | 2.0 | ● |
| | 7104204 | HA4R8RA2000R038HAR250IM | 20,00 | 20,00 | 38,00 | 104,00 | 2.5 | ● |
| | 7104205 | HA4R8RA2000R038HAR300IM | 20,00 | 20,00 | 38,00 | 104,00 | 3.0 | ● |
| | 7104206 | HA4R8RA2000R038HAR400IM | 20,00 | 20,00 | 38,00 | 104,00 | 4.0 | ● |
| | 7104207 | HA4R8RA2000R038HAR600IM | 20,00 | 20,00 | 38,00 | 104,00 | 6.0 | ● |
| | 7104209 | HA4R8RA2500R045HAR050IM | 25,00 | 25,00 | 45,00 | 121,00 | 0.5 | ● |
| 7104210 | HA4R8RA2500R045HAR100IM | 25,00 | 25,00 | 45,00 | 121,00 | 1.0 | ● | |
| 7104211 | HA4R8RA2500R045HAR200IM | 25,00 | 25,00 | 45,00 | 121,00 | 2.0 | ● | |
| 7104212 | HA4R8RA2500R045HAR250IM | 25,00 | 25,00 | 45,00 | 121,00 | 2.5 | ● | |
| 7104213 | HA4R8RA2500R045HAR300IM | 25,00 | 25,00 | 45,00 | 121,00 | 3.0 | ● | |
| 7104214 | HA4R8RA2500R045HAR400IM | 25,00 | 25,00 | 45,00 | 121,00 | 4.0 | ● | |



- Primary
- Secondary

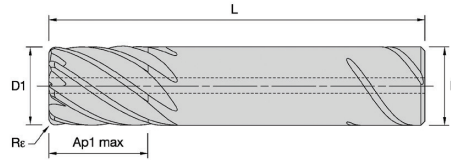
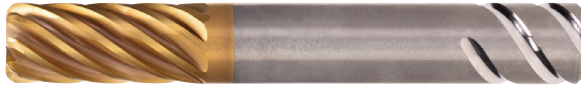
| | | |
|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

HARVI™ IV

Radiused • 8 Flutes • Chip Splitters • Internal Coolant • Plain Shank • **METRIC**

KCSM15A

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | Re | |
|---------|-------------------------|-------------------------|-------|--------|---------|--------|-----|---|
| Metric | 7104255 | HA4R8RA1000X040HAR050DM | 10,00 | 10,00 | 40,00 | 90,00 | 0.5 | ● |
| | 7104256 | HA4R8RA1000X040HAR100DM | 10,00 | 10,00 | 40,00 | 90,00 | 1.0 | ● |
| | 7104257 | HA4R8RA1000X040HAR200DM | 10,00 | 10,00 | 40,00 | 90,00 | 2.0 | ● |
| | 7104258 | HA4R8RA1000X040HAR250DM | 10,00 | 10,00 | 40,00 | 90,00 | 2.5 | ● |
| | 7104259 | HA4R8RA1000X040HAR300DM | 10,00 | 10,00 | 40,00 | 90,00 | 3.0 | ● |
| | 7104271 | HA4R8RA1200X048HAR050DM | 12,00 | 12,00 | 48,00 | 105,00 | 0.5 | ● |
| | 7104272 | HA4R8RA1200X048HAR100DM | 12,00 | 12,00 | 48,00 | 105,00 | 1.0 | ● |
| | 7104273 | HA4R8RA1200X048HAR200DM | 12,00 | 12,00 | 48,00 | 105,00 | 2.0 | ● |
| | 7104274 | HA4R8RA1200X048HAR250DM | 12,00 | 12,00 | 48,00 | 105,00 | 2.5 | ● |
| | 7104275 | HA4R8RA1200X048HAR300DM | 12,00 | 12,00 | 48,00 | 105,00 | 3.0 | ● |
| | 7104277 | HA4R8RA1600X064HAR050DM | 16,00 | 16,00 | 64,00 | 125,00 | 0.5 | ● |
| | 7104278 | HA4R8RA1600X064HAR100DM | 16,00 | 16,00 | 64,00 | 125,00 | 1.0 | ● |
| | 7104279 | HA4R8RA1600X064HAR200DM | 16,00 | 16,00 | 64,00 | 125,00 | 2.0 | ● |
| | 7104280 | HA4R8RA1600X064HAR250DM | 16,00 | 16,00 | 64,00 | 125,00 | 2.5 | ● |
| | 7104281 | HA4R8RA1600X064HAR300DM | 16,00 | 16,00 | 64,00 | 125,00 | 3.0 | ● |
| | 7104282 | HA4R8RA1600X064HAR400DM | 16,00 | 16,00 | 64,00 | 125,00 | 4.0 | ● |
| | 7104284 | HA4R8RA2000X080HAR050DM | 20,00 | 20,00 | 80,00 | 145,00 | 0.5 | ● |
| | 7104285 | HA4R8RA2000X080HAR100DM | 20,00 | 20,00 | 80,00 | 145,00 | 1.0 | ● |
| | 7104286 | HA4R8RA2000X080HAR200DM | 20,00 | 20,00 | 80,00 | 145,00 | 2.0 | ● |
| | 7104287 | HA4R8RA2000X080HAR250DM | 20,00 | 20,00 | 80,00 | 145,00 | 2.5 | ● |
| | 7104288 | HA4R8RA2000X080HAR300DM | 20,00 | 20,00 | 80,00 | 145,00 | 3.0 | ● |
| | 7104289 | HA4R8RA2000X080HAR400DM | 20,00 | 20,00 | 80,00 | 145,00 | 4.0 | ● |
| | 7104290 | HA4R8RA2000X080HAR600DM | 20,00 | 20,00 | 80,00 | 145,00 | 6.0 | ● |
| | 7104292 | HA4R8RA2500X100HAR050DM | 25,00 | 25,00 | 100,00 | 175,00 | 0.5 | ● |
| | 7104293 | HA4R8RA2500X100HAR100DM | 25,00 | 25,00 | 100,00 | 175,00 | 1.0 | ● |
| | 7104294 | HA4R8RA2500X100HAR200DM | 25,00 | 25,00 | 100,00 | 175,00 | 2.0 | ● |
| | 7104295 | HA4R8RA2500X100HAR250DM | 25,00 | 25,00 | 100,00 | 175,00 | 2.5 | ● |
| | 7104296 | HA4R8RA2500X100HAR300DM | 25,00 | 25,00 | 100,00 | 175,00 | 3.0 | ● |
| 7104297 | HA4R8RA2500X100HAR400DM | 25,00 | 25,00 | 100,00 | 175,00 | 4.0 | ● | |



- Primary
- Secondary

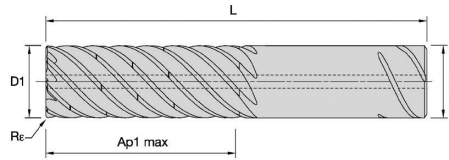
| | | |
|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

HARVI™ IV

Radiused • 8 Flutes • Internal Coolant • Safe-Lock™ Shank • **METRIC**

KCSM15A

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | Re | |
|---------------|-------------------------|-------------------------|-------|-------|---------|--------|-----|---|
| Metric | 7104216 | HA4R8RA1200R026SLR050IM | 12,00 | 12,00 | 26,00 | 83,00 | 0.5 | ● |
| | 7104217 | HA4R8RA1200R026SLR100IM | 12,00 | 12,00 | 26,00 | 83,00 | 1.0 | ● |
| | 7104218 | HA4R8RA1200R026SLR200IM | 12,00 | 12,00 | 26,00 | 83,00 | 2.0 | ● |
| | 7104219 | HA4R8RA1200R026SLR250IM | 12,00 | 12,00 | 26,00 | 83,00 | 2.5 | ● |
| | 7104220 | HA4R8RA1200R026SLR300IM | 12,00 | 12,00 | 26,00 | 83,00 | 3.0 | ● |
| | 7104222 | HA4R8RA1600R032SLR050IM | 16,00 | 16,00 | 32,00 | 92,00 | 0.5 | ● |
| | 7104223 | HA4R8RA1600R032SLR100IM | 16,00 | 16,00 | 32,00 | 92,00 | 1.0 | ● |
| | 7104224 | HA4R8RA1600R032SLR200IM | 16,00 | 16,00 | 32,00 | 92,00 | 2.0 | ● |
| | 7104225 | HA4R8RA1600R032SLR250IM | 16,00 | 16,00 | 32,00 | 92,00 | 2.5 | ● |
| | 7104226 | HA4R8RA1600R032SLR300IM | 16,00 | 16,00 | 32,00 | 92,00 | 3.0 | ● |
| | 7104227 | HA4R8RA1600R032SLR400IM | 16,00 | 16,00 | 32,00 | 92,00 | 4.0 | ● |
| | 7104229 | HA4R8RA2000R038SLR050IM | 20,00 | 20,00 | 38,00 | 104,00 | 0.5 | ● |
| | 7104230 | HA4R8RA2000R038SLR100IM | 20,00 | 20,00 | 38,00 | 104,00 | 1.0 | ● |
| | 7104231 | HA4R8RA2000R038SLR200IM | 20,00 | 20,00 | 38,00 | 104,00 | 2.0 | ● |
| | 7104232 | HA4R8RA2000R038SLR250IM | 20,00 | 20,00 | 38,00 | 104,00 | 2.5 | ● |
| | 7104233 | HA4R8RA2000R038SLR300IM | 20,00 | 20,00 | 38,00 | 104,00 | 3.0 | ● |
| | 7104234 | HA4R8RA2000R038SLR400IM | 20,00 | 20,00 | 38,00 | 104,00 | 4.0 | ● |
| | 7104235 | HA4R8RA2000R038SLR600IM | 20,00 | 20,00 | 38,00 | 104,00 | 6.0 | ● |
| | 7104237 | HA4R8RA2500R045SLR050IM | 25,00 | 25,00 | 45,00 | 121,00 | 0.5 | ● |
| | 7104238 | HA4R8RA2500R045SLR100IM | 25,00 | 25,00 | 45,00 | 121,00 | 1.0 | ● |
| | 7104239 | HA4R8RA2500R045SLR200IM | 25,00 | 25,00 | 45,00 | 121,00 | 2.0 | ● |
| | 7104240 | HA4R8RA2500R045SLR250IM | 25,00 | 25,00 | 45,00 | 121,00 | 2.5 | ● |
| 7104251 | HA4R8RA2500R045SLR300IM | 25,00 | 25,00 | 45,00 | 121,00 | 3.0 | ● | |
| 7104252 | HA4R8RA2500R045SLR400IM | 25,00 | 25,00 | 45,00 | 121,00 | 4.0 | ● | |



- Primary
- Secondary

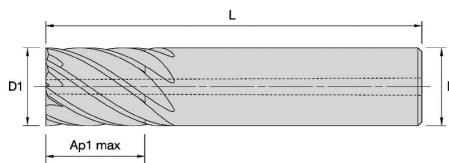
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|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

HARVI™ IV

Radiused • 8 Flutes • Chip Splitters • Internal Coolant • Safe-Lock™ Shank • **METRIC**

KCSM15A

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | Rε | |
|---------|-------------------------|-------------------------|-------|--------|---------|--------|-----|---|
| Metric | 7104299 | HA4R8RA1200X048SLR050DM | 12,00 | 12,00 | 48,00 | 105,00 | 0.5 | ● |
| | 7104300 | HA4R8RA1200X048SLR100DM | 12,00 | 12,00 | 48,00 | 105,00 | 1.0 | ● |
| | 7104301 | HA4R8RA1200X048SLR200DM | 12,00 | 12,00 | 48,00 | 105,00 | 2.0 | ● |
| | 7104302 | HA4R8RA1200X048SLR250DM | 12,00 | 12,00 | 48,00 | 105,00 | 2.5 | ● |
| | 7104303 | HA4R8RA1200X048SLR300DM | 12,00 | 12,00 | 48,00 | 105,00 | 3.0 | ● |
| | 7104305 | HA4R8RA1600X064SLR050DM | 16,00 | 16,00 | 64,00 | 125,00 | 0.5 | ● |
| | 7104306 | HA4R8RA1600X064SLR100DM | 16,00 | 16,00 | 64,00 | 125,00 | 1.0 | ● |
| | 7104307 | HA4R8RA1600X064SLR200DM | 16,00 | 16,00 | 64,00 | 125,00 | 2.0 | ● |
| | 7104308 | HA4R8RA1600X064SLR250DM | 16,00 | 16,00 | 64,00 | 125,00 | 2.5 | ● |
| | 7104309 | HA4R8RA1600X064SLR300DM | 16,00 | 16,00 | 64,00 | 125,00 | 3.0 | ● |
| | 7104313 | HA4R8RA1600X064SLR400DM | 16,00 | 16,00 | 64,00 | 125,00 | 4.0 | ● |
| | 7104315 | HA4R8RA2000X080SLR050DM | 20,00 | 20,00 | 80,00 | 145,00 | 0.5 | ● |
| | 7104316 | HA4R8RA2000X080SLR100DM | 20,00 | 20,00 | 80,00 | 145,00 | 1.0 | ● |
| | 7104317 | HA4R8RA2000X080SLR200DM | 20,00 | 20,00 | 80,00 | 145,00 | 2.0 | ● |
| | 7104318 | HA4R8RA2000X080SLR250DM | 20,00 | 20,00 | 80,00 | 145,00 | 2.5 | ● |
| | 7104319 | HA4R8RA2000X080SLR300DM | 20,00 | 20,00 | 80,00 | 145,00 | 3.0 | ● |
| | 7104320 | HA4R8RA2000X080SLR400DM | 20,00 | 20,00 | 80,00 | 145,00 | 4.0 | ● |
| | 7104321 | HA4R8RA2000X080SLR600DM | 20,00 | 20,00 | 80,00 | 145,00 | 6.0 | ● |
| | 7104323 | HA4R8RA2500X100SLR050DM | 25,00 | 25,00 | 100,00 | 175,00 | 0.5 | ● |
| | 7104324 | HA4R8RA2500X100SLR100DM | 25,00 | 25,00 | 100,00 | 175,00 | 1.0 | ● |
| 7104325 | HA4R8RA2500X100SLR200DM | 25,00 | 25,00 | 100,00 | 175,00 | 2.0 | ● | |
| 7104326 | HA4R8RA2500X100SLR250DM | 25,00 | 25,00 | 100,00 | 175,00 | 2.5 | ● | |
| 7104327 | HA4R8RA2500X100SLR300DM | 25,00 | 25,00 | 100,00 | 175,00 | 3.0 | ● | |
| 7104328 | HA4R8RA2500X100SLR400DM | 25,00 | 25,00 | 100,00 | 175,00 | 4.0 | ● | |



- Primary
- Secondary

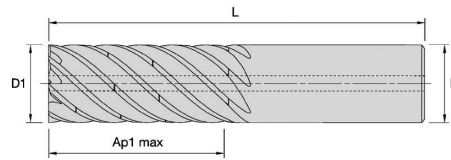
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|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

HARVI™ IV

Square End • 8 Flutes • Internal Coolant • Plain Shank • **METRIC**

KCSM15A

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | |
|--------|--------------|---------------------|-------|-------|---------|--------|---|
| Metric | 7104187 | HA4R8SE1000R022HAIM | 10,00 | 10,00 | 22,00 | 72,00 | ● |
| | 7104193 | HA4R8SE1200R026HAIM | 12,00 | 12,00 | 26,00 | 83,00 | ● |
| | 7104200 | HA4R8SE1600R032HAIM | 16,00 | 16,00 | 32,00 | 92,00 | ● |
| | 7104208 | HA4R8SE2000R038HAIM | 20,00 | 20,00 | 38,00 | 104,00 | ● |
| | 7104215 | HA4R8SE2500R045HAIM | 25,00 | 25,00 | 45,00 | 121,00 | ● |



- Primary
- Secondary

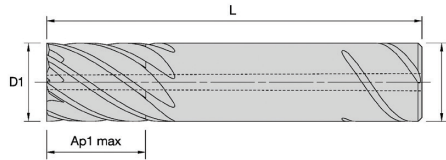
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|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

HARVI™ IV

Square End • 8 Flutes • Chip Splitters • Internal Coolant • Plain Shank • **METRIC**

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | |
|---------------|--------------|---------------------|-------|-------|---------|--------|---|
| Metric | 7104260 | HA4R8SE1000X040HADM | 10,00 | 10,00 | 40,00 | 90,00 | ● |
| | 7104276 | HA4R8SE1200X048HADM | 12,00 | 12,00 | 48,00 | 105,00 | ● |
| | 7104283 | HA4R8SE1600X064HADM | 16,00 | 16,00 | 64,00 | 125,00 | ● |
| | 7104291 | HA4R8SE2000X080HADM | 20,00 | 20,00 | 80,00 | 145,00 | ● |
| | 7104298 | HA4R8SE2500X100HADM | 25,00 | 25,00 | 100,00 | 175,00 | ● |

KCSM15A



- Primary
- Secondary

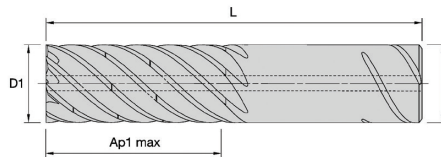
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|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

HARVI™ IV

Square End • 8 Flutes • Internal Coolant • Safe-Lock™ Shank • **METRIC**

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | |
|---------------|--------------|---------------------|-------|-------|---------|--------|---|
| Metric | 7104221 | HA4R8SE1200R026SLIM | 12,00 | 12,00 | 26,00 | 83,00 | ● |
| | 7104228 | HA4R8SE1600R032SLIM | 16,00 | 16,00 | 32,00 | 92,00 | ● |
| | 7104236 | HA4R8SE2000R038SLIM | 20,00 | 20,00 | 38,00 | 104,00 | ● |
| | 7104254 | HA4R8SE2500R045SLIM | 25,00 | 25,00 | 45,00 | 121,00 | ● |

KCSM15A



- Primary
- Secondary

| | | |
|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

HARVI™ IV

Square End • 8 Flutes • Chip Splitters • Internal Coolant • Safe-Lock™ Shank • **METRIC**

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | |
|---------------|--------------|---------------------|-------|-------|---------|--------|---|
| Metric | 7104304 | HA4R8SE1200X048SLDM | 12,00 | 12,00 | 48,00 | 105,00 | ● |
| | 7104314 | HA4R8SE1600X064SLDM | 16,00 | 16,00 | 64,00 | 125,00 | ● |
| | 7104322 | HA4R8SE2000X080SLDM | 20,00 | 20,00 | 80,00 | 145,00 | ● |
| | 7104329 | HA4R8SE2500X100SLDM | 25,00 | 25,00 | 100,00 | 175,00 | ● |

KCSM15A

HARVI™ IV • Side Milling/Slotting • Application Data • METRIC

| Material Group | Max Ae Factor (KAp) | KCSM15A Base Cutting Speed Vc m/min | Feed per Tooth (fz=mm/th) | | | | | |
|----------------|---------------------|--|---------------------------|-------|-------|-------|-------|-------|
| | | | D1 - Diameter (mm) | | | | | |
| | | | 10 | 12 | 16 | 20 | 25 | |
| P | 3 | 1 | 130 | 0,049 | 0,044 | 0,067 | 0,080 | 0,095 |
| | 4 | 1 | 100 | 0,044 | 0,049 | 0,059 | 0,069 | 0,081 |
| | 5 | 0,8 | 65 | 0,038 | 0,043 | 0,053 | 0,063 | 0,076 |
| | 6 | 0,7 | 50 | 0,032 | 0,036 | 0,043 | 0,050 | 0,060 |
| M | 1 | 1 | 80 | 0,049 | 0,055 | 0,067 | 0,080 | 0,095 |
| | 2 | 0,8 | 60 | 0,038 | 0,043 | 0,053 | 0,063 | 0,076 |
| | 3 | 0,8 | 60 | 0,032 | 0,036 | 0,043 | 0,050 | 0,060 |
| S | 1 | 0,5 | 50 | 0,049 | 0,055 | 0,067 | 0,080 | 0,095 |
| | 2 | 0,5 | 30 | 0,038 | 0,043 | 0,053 | 0,063 | 0,076 |
| | 3 | 0,5 | 25 | 0,026 | 0,030 | 0,036 | 0,043 | 0,051 |
| | 4 | 0,7 | 45 | 0,041 | 0,051 | 0,061 | 0,069 | 0,081 |
| H | 1 | 0,8 | 80 | 0,044 | 0,049 | 0,059 | 0,069 | 0,081 |
| | 2 | 0,5 | 70 | 0,037 | 0,041 | 0,050 | 0,059 | 0,070 |

NOTE:

These guidelines may require variations to achieve optimum results.

Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >12 mm diameter. Maximum ramp angle is 2°.

Tools with chip splitters can be used as finishers.

Maximum Cutting Width and Adjustment Factors for Speed & Feed Calculation • METRIC

Maximum cutting width (Ae) for given cutting depth (Ap)

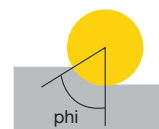
| Ap | ≤0,125 x D1 | >0,125xD1 ≤ 0,5xD1 | >0,5xD1 ≤ 1xD1 | >1xD1 ≤ 2xD1 | >2xD1 ≤ 3xD1 | >3xD1 ≤ 4xD1 | >4 x D1 |
|--------|-------------|--------------------|----------------|----------------|----------------|----------------|----------------|
| Max Ae | 100% x D1 | 50% x D1 x KAp | 40% x D1 x KAp | 30% x D1 x KAp | 20% x D1 x KAp | 15% x D1 x KAp | 10% x D1 x KAp |

Adjustment factors for speed (Vc) and feed (Fz)

| Ae/D1 | ≤2% | >2% ≤ 5% | >5 ≤ 7,5% | >7,5% ≤ 10% | >10% ≤ 15% | >15% ≤ 20% | >20% ≤ 30% | >30% ≤ 40% | >40% ≤ 50% | >50% ≤ 100% |
|-------|------|----------|-----------|-------------|------------|------------|------------|------------|------------|-------------|
| Kv | 3 | 2,5 | 1,9 | 1,4 | 1,35 | 1,3 | 1,2 | 1,1 | 1 | 0,9 |
| KFz | 3,28 | 2,3 | 1,95 | 1,7 | 1,5 | 1,25 | 1,09 | 1,02 | 1 | 1 |

Angle of engagement (phi°) relative to cutting width (Ae)

| Ae | 2% | 5% | 7,50% | 10% | 15% | 20% | 30% | 40% | 50% | 100% |
|------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-----|------|
| Angle of Engagement - (phi°) | 16,26 | 25,84 | 31,79 | 36,87 | 45,57 | 53,13 | 66,42 | 78,46 | 90 | 180 |



To calculate application specific cutting data, please use KAp, Kv, and Kfz from tables above for adaption of cutting speeds and feeds respectively:

$$\text{Maximum Ae} = \text{KAp} \cdot \text{D1} \cdot \text{Ap1Max/D1}$$

$$\text{Vc new} = \text{Vc} \cdot \text{Kv}$$

$$\text{Fz new} = \text{Fz} \cdot \text{KFz}$$

Sample Calculation

Material: S4

D1: 25 mm

Ap: 2xD1

$$\text{Max Ae: } 30\% \times \text{KAp} \times \text{D1} = 30\% \times 0,7 \times \text{D1} = 21\% \times \text{D1}$$

$$\text{M/Min: Base} \times \text{Kv} = 45 \times 1,2 = 37,5$$

$$\text{Fz: Base} \times \text{KFz} = 0,081 \times 1,09 = 0,088$$

Final cutting data recommendation:

$$\text{Max Ae} = 30\% \cdot 0,7 \cdot 25 = 5,25 \text{ mm}$$

$$\text{Vc new} = 45 \cdot 1,2 = 37,5 \text{ m/min}$$

$$\text{Fz new} = 0,081 \cdot 1,09 = 0,088 \text{ mm/th}$$

Application Data • Minimum Helical Interpolation Diameter • METRIC

| Tool. dia. mm | Interpolation dia. mm |
|---------------|-----------------------|
| 10 | 14,25 |
| 12 | 16,25 |
| 16 | 21,31 |
| 20 | 26,38 |
| 25 | 32,44 |

Maximum ramp angle is 2° on centerline.

Industries



Aerospace



Medical

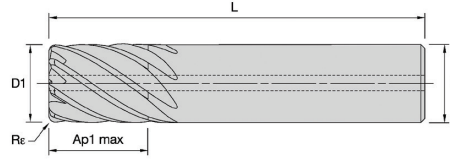


General Engineering



Wind & Solar

INCH



- Primary
- Secondary

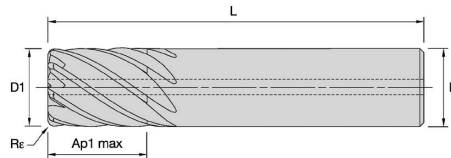
| | | |
|---|---------------------------------------|---|
| P | ■ | ○ |
| M | ■ | ● |
| K | ■ | |
| N | ■ | |
| S | ■ | ● |
| H | ■ | ○ |

HARVI™ IV

Radiused • 8 Flutes • Internal Coolant • Plain Shank • **INCH**

KCSM15A

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | Re | |
|---------|------------------------|------------------------|-----|-------|---------|-------|-------|---|
| Inch | 7102409 | HA4R8RA0375S050HAR015I | 3/8 | 3/8 | 1/2 | 2 1/2 | 0.015 | ● |
| | 7102410 | HA4R8RA0375S050HAR030I | 3/8 | 3/8 | 1/2 | 2 1/2 | .030 | ● |
| | 7102421 | HA4R8RA0375S050HAR060I | 3/8 | 3/8 | 1/2 | 2 1/2 | .060 | ● |
| | 7102423 | HA4R8RA0375R075HAR015I | 3/8 | 3/8 | 3/4 | 2 1/2 | .015 | ● |
| | 7102424 | HA4R8RA0375R075HAR030I | 3/8 | 3/8 | 3/4 | 2 1/2 | .030 | ● |
| | 7102425 | HA4R8RA0375R075HAR060I | 3/8 | 3/8 | 3/4 | 2 1/2 | .060 | ● |
| | 7102427 | HA4R8RA0500S063HAR015I | 1/2 | 1/2 | 5/8 | 3 | 0.015 | ● |
| | 7102428 | HA4R8RA0500S063HAR030I | 1/2 | 1/2 | 5/8 | 3 | 0.03 | ● |
| | 7102429 | HA4R8RA0500S063HAR060I | 1/2 | 1/2 | 5/8 | 3 | .060 | ● |
| | 7102430 | HA4R8RA0500S063HAR090I | 1/2 | 1/2 | 5/8 | 3 | .090 | ● |
| | 7102431 | HA4R8RA0500S063HAR120I | 1/2 | 1/2 | 5/8 | 3 | .120 | ● |
| | 7102433 | HA4R8RA0500R100HAR015I | 1/2 | 1/2 | 1 | 3 | .015 | ● |
| | 7102434 | HA4R8RA0500R100HAR030I | 1/2 | 1/2 | 1 | 3 | .030 | ● |
| | 7102435 | HA4R8RA0500R100HAR060I | 1/2 | 1/2 | 1 | 3 | .060 | ● |
| | 7102436 | HA4R8RA0500R100HAR090I | 1/2 | 1/2 | 1 | 3 | .090 | ● |
| | 7102437 | HA4R8RA0500R100HAR120I | 1/2 | 1/2 | 1 | 3 | .120 | ● |
| | 7102439 | HA4R8RA0625S075HAR030I | 5/8 | 5/8 | 3/4 | 3 | 0.03 | ● |
| | 7102440 | HA4R8RA0625S075HAR060I | 5/8 | 5/8 | 3/4 | 3 | 0.06 | ● |
| | 7102441 | HA4R8RA0625S075HAR090I | 5/8 | 5/8 | 3/4 | 3 | 0.09 | ● |
| | 7102442 | HA4R8RA0625S075HAR120I | 5/8 | 5/8 | 3/4 | 3 | 0.12 | ● |
| | 7102443 | HA4R8RA0625S075HAR190I | 5/8 | 5/8 | 3/4 | 3 | 0.19 | ● |
| | 7102448 | HA4R8RA0625R125HAR030I | 5/8 | 5/8 | 1 1/4 | 3 1/2 | .030 | ● |
| | 7102449 | HA4R8RA0625R125HAR060I | 5/8 | 5/8 | 1 1/4 | 3 1/2 | .060 | ● |
| | 7102450 | HA4R8RA0625R125HAR090I | 5/8 | 5/8 | 1 1/4 | 3 1/2 | .090 | ● |
| | 7102451 | HA4R8RA0625R125HAR120I | 5/8 | 5/8 | 1 1/4 | 3 1/2 | .120 | ● |
| | 7102452 | HA4R8RA0625R125HAR190I | 5/8 | 5/8 | 1 1/4 | 3 1/2 | .190 | ● |
| | 7102454 | HA4R8RA0750S100HAR030I | 3/4 | 3/4 | 1 | 3 1/2 | .030 | ● |
| | 7102455 | HA4R8RA0750S100HAR060I | 3/4 | 3/4 | 1 | 3 1/2 | .060 | ● |
| | 7102456 | HA4R8RA0750S100HAR090I | 3/4 | 3/4 | 1 | 3 1/2 | .090 | ● |
| | 7102457 | HA4R8RA0750S100HAR120I | 3/4 | 3/4 | 1 | 3 1/2 | .120 | ● |
| | 7102458 | HA4R8RA0750S100HAR190I | 3/4 | 3/4 | 1 | 3 1/2 | .190 | ● |
| | 7102460 | HA4R8RA0750R163HAR030I | 3/4 | 3/4 | 1 5/8 | 4 | .030 | ● |
| | 7102461 | HA4R8RA0750R163HAR060I | 3/4 | 3/4 | 1 5/8 | 4 | .060 | ● |
| | 7102462 | HA4R8RA0750R163HAR090I | 3/4 | 3/4 | 1 5/8 | 4 | .090 | ● |
| 7102463 | HA4R8RA0750R163HAR120I | 3/4 | 3/4 | 1 5/8 | 4 | .120 | ● | |
| 7102464 | HA4R8RA0750R163HAR190I | 3/4 | 3/4 | 1 5/8 | 4 | .190 | ● | |
| 7102466 | HA4R8RA1000S125HAR030I | 1 | 1 | 1 1/4 | 4 | .030 | ● | |
| 7102467 | HA4R8RA1000S125HAR060I | 1 | 1 | 1 1/4 | 4 | .060 | ● | |



- Primary
- Secondary

| | | |
|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

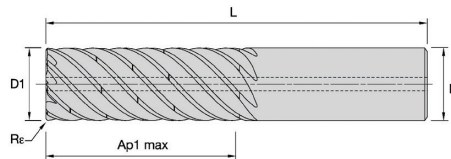
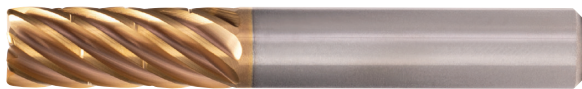
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HARVI™ IV

Radiused • 8 Flutes • Internal Coolant • Plain Shank • **INCH**

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | Re | |
|------|--------------|------------------------|----|---|---------|-------|------|---|
| Inch | 7102468 | HA4R8RA1000S125HAR120I | 1 | 1 | 1 1/4 | 4 | .120 | ● |
| | 7102469 | HA4R8RA1000S125HAR190I | 1 | 1 | 1 1/4 | 4 | .190 | ● |
| | 7102470 | HA4R8RA1000S125HAR250I | 1 | 1 | 1 1/4 | 4 | .250 | ● |
| | 7102472 | HA4R8RA1000S175HAR030I | 1 | 1 | 1 3/4 | 4 1/2 | .030 | ● |
| | 7102473 | HA4R8RA1000S175HAR060I | 1 | 1 | 1 3/4 | 4 1/2 | .060 | ● |
| | 7102474 | HA4R8RA1000S175HAR120I | 1 | 1 | 1 3/4 | 4 1/2 | .120 | ● |
| | 7102475 | HA4R8RA1000S175HAR190I | 1 | 1 | 1 3/4 | 4 1/2 | 0.19 | ● |
| | 7102476 | HA4R8RA1000S175HAR250I | 1 | 1 | 1 3/4 | 4 1/2 | .250 | ● |
| | 7102478 | HA4R8RA1000R200HAR030I | 1 | 1 | 2 | 5 | .030 | ● |
| | 7102479 | HA4R8RA1000R200HAR060I | 1 | 1 | 2 | 5 | .060 | ● |
| | 7102480 | HA4R8RA1000R200HAR120I | 1 | 1 | 2 | 5 | .120 | ● |
| | 7102481 | HA4R8RA1000R200HAR190I | 1 | 1 | 2 | 5 | .190 | ● |
| | 7102482 | HA4R8RA1000R200HAR250I | 1 | 1 | 2 | 5 | .250 | ● |

KCSM15A



- Primary
- Secondary

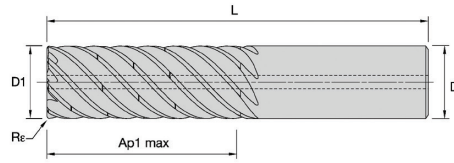
| | | |
|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

HARVI™ IV

Radiused • 8 Flutes • Chip Splitters • Internal Coolant • Plain Shank • **INCH**

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | Re | |
|------|--------------|------------------------|-----|-----|---------|-------|------|---|
| Inch | 7102837 | HA4R8RA0375R100HAR030D | 3/8 | 3/8 | 1 | 3 | .030 | ● |
| | 7102838 | HA4R8RA0375R100HAR060D | 3/8 | 3/8 | 1 | 3 | .060 | ● |
| | 7102840 | HA4R8RA0375L125HAR015D | 3/8 | 3/8 | 1 1/4 | 3 | .015 | ● |
| | 7102851 | HA4R8RA0375L125HAR030D | 3/8 | 3/8 | 1 1/4 | 3 | .030 | ● |
| | 7102852 | HA4R8RA0375L125HAR060D | 3/8 | 3/8 | 1 1/4 | 3 | .060 | ● |
| | 7102854 | HA4R8RA0375X150HAR030D | 3/8 | 3/8 | 1 1/2 | 3 1/2 | .030 | ● |
| | 7102855 | HA4R8RA0375X150HAR060D | 3/8 | 3/8 | 1 1/2 | 3 1/2 | .060 | ● |
| | 7102857 | HA4R8RA0500R125HAR030D | 1/2 | 1/2 | 1 1/4 | 3 1/2 | .030 | ● |
| | 7102858 | HA4R8RA0500R125HAR060D | 1/2 | 1/2 | 1 1/4 | 3 1/2 | .060 | ● |
| | 7102859 | HA4R8RA0500R125HAR090D | 1/2 | 1/2 | 1 1/4 | 3 1/2 | .090 | ● |
| | 7102860 | HA4R8RA0500R125HAR120D | 1/2 | 1/2 | 1 1/4 | 3 1/2 | .120 | ● |
| | 7102862 | HA4R8RA0500L163HAR015D | 1/2 | 1/2 | 1 5/8 | 4 | .015 | ● |
| | 7102863 | HA4R8RA0500L163HAR030D | 1/2 | 1/2 | 1 5/8 | 4 | .030 | ● |
| | 7102864 | HA4R8RA0500L163HAR060D | 1/2 | 1/2 | 1 5/8 | 4 | .060 | ● |
| | 7102865 | HA4R8RA0500L163HAR090D | 1/2 | 1/2 | 1 5/8 | 4 | .090 | ● |
| | 7102866 | HA4R8RA0500L163HAR120D | 1/2 | 1/2 | 1 5/8 | 4 | .120 | ● |
| | 7102868 | HA4R8RA0500X200HAR030D | 1/2 | 1/2 | 2 | 4 | .030 | ● |
| | 7102869 | HA4R8RA0500X200HAR060D | 1/2 | 1/2 | 2 | 4 | .060 | ● |
| | 7102870 | HA4R8RA0500X200HAR090D | 1/2 | 1/2 | 2 | 4 | .090 | ● |
| | 7102871 | HA4R8RA0500X200HAR120D | 1/2 | 1/2 | 2 | 4 | .120 | ● |

KCSM15A



- Primary
- Secondary

| | | |
|---|---|---|
| P | | ○ |
| M | | ● |
| K | | ○ |
| N | | ○ |
| S | | ● |
| H | | ○ |

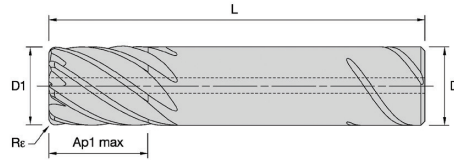
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HARVI™ IV

Radiused • 8 Flutes • Chip Splitters • Internal Coolant • Plain Shank • **INCH**

KCSM15A

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | R _e | |
|---------|------------------------|------------------------|-----|-----|---------|-------|----------------|---|
| Inch | 7102873 | HA4R8RA0625R163HAR030D | 5/8 | 5/8 | 1 5/8 | 4 | .030 | ● |
| | 7102874 | HA4R8RA0625R163HAR060D | 5/8 | 5/8 | 1 5/8 | 4 | .060 | ● |
| | 7102875 | HA4R8RA0625R163HAR090D | 5/8 | 5/8 | 1 5/8 | 4 | .090 | ● |
| | 7102876 | HA4R8RA0625R163HAR120D | 5/8 | 5/8 | 1 5/8 | 4 | .120 | ● |
| | 7102877 | HA4R8RA0625R163HAR190D | 5/8 | 5/8 | 1 5/8 | 4 | .190 | ● |
| | 7102879 | HA4R8RA0625L188HAR030D | 5/8 | 5/8 | 1 7/8 | 4 | .030 | ● |
| | 7102880 | HA4R8RA0625L188HAR060D | 5/8 | 5/8 | 1 7/8 | 4 | .060 | ● |
| | 7102881 | HA4R8RA0625L188HAR090D | 5/8 | 5/8 | 1 7/8 | 4 | .090 | ● |
| | 7102882 | HA4R8RA0625L188HAR120D | 5/8 | 5/8 | 1 7/8 | 4 | .120 | ● |
| | 7102883 | HA4R8RA0625L188HAR190D | 5/8 | 5/8 | 1 7/8 | 4 | .190 | ● |
| | 7102885 | HA4R8RA0625X250HAR030D | 5/8 | 5/8 | 2 1/2 | 5 | .030 | ● |
| | 7102886 | HA4R8RA0625X250HAR060D | 5/8 | 5/8 | 2 1/2 | 5 | .060 | ● |
| | 7102887 | HA4R8RA0625X250HAR090D | 5/8 | 5/8 | 2 1/2 | 5 | .090 | ● |
| | 7102888 | HA4R8RA0625X250HAR120D | 5/8 | 5/8 | 2 1/2 | 5 | .120 | ● |
| | 7102889 | HA4R8RA0625X250HAR190D | 5/8 | 5/8 | 2 1/2 | 5 | .190 | ● |
| | 7102891 | HA4R8RA0750R163HAR030D | 3/4 | 3/4 | 1 5/8 | 4 | .030 | ● |
| | 7102892 | HA4R8RA0750R163HAR060D | 3/4 | 3/4 | 1 5/8 | 4 | .060 | ● |
| | 7102893 | HA4R8RA0750R163HAR090D | 3/4 | 3/4 | 1 5/8 | 4 | .090 | ● |
| | 7102894 | HA4R8RA0750R163HAR120D | 3/4 | 3/4 | 1 5/8 | 4 | .120 | ● |
| | 7102895 | HA4R8RA0750R163HAR190D | 3/4 | 3/4 | 1 5/8 | 4 | .190 | ● |
| | 7102897 | HA4R8RA0750L225HAR030D | 3/4 | 3/4 | 2 1/4 | 5 | .030 | ● |
| | 7102898 | HA4R8RA0750L225HAR060D | 3/4 | 3/4 | 2 1/4 | 5 | .060 | ● |
| | 7102899 | HA4R8RA0750L225HAR090D | 3/4 | 3/4 | 2 1/4 | 5 | .090 | ● |
| | 7102900 | HA4R8RA0750L225HAR120D | 3/4 | 3/4 | 2 1/4 | 5 | .120 | ● |
| | 7102901 | HA4R8RA0750L225HAR190D | 3/4 | 3/4 | 2 1/4 | 5 | .190 | ● |
| | 7102903 | HA4R8RA0750X325HAR030D | 3/4 | 3/4 | 3 1/4 | 6 | .030 | ● |
| | 7102904 | HA4R8RA0750X325HAR060D | 3/4 | 3/4 | 3 1/4 | 6 | .060 | ● |
| | 7102905 | HA4R8RA0750X325HAR090D | 3/4 | 3/4 | 3 1/4 | 6 | .090 | ● |
| | 7102907 | HA4R8RA0750X325HAR120D | 3/4 | 3/4 | 3 1/4 | 6 | .120 | ● |
| | 7102908 | HA4R8RA0750X325HAR190D | 3/4 | 3/4 | 3 1/4 | 6 | .190 | ● |
| | 7102910 | HA4R8RA1000R250HAR030D | 1 | 1 | 2 1/2 | 5 1/2 | .030 | ● |
| | 7102911 | HA4R8RA1000R250HAR060D | 1 | 1 | 2 1/2 | 5 1/2 | .060 | ● |
| | 7102912 | HA4R8RA1000R250HAR120D | 1 | 1 | 2 1/2 | 5 1/2 | .120 | ● |
| | 7102913 | HA4R8RA1000R250HAR190D | 1 | 1 | 2 1/2 | 5 1/2 | .190 | ● |
| | 7102914 | HA4R8RA1000R250HAR250D | 1 | 1 | 2 1/2 | 5 1/2 | .250 | ● |
| | 7102916 | HA4R8RA1000L325HAR030D | 1 | 1 | 3 1/4 | 6 | .030 | ● |
| | 7102917 | HA4R8RA1000L325HAR060D | 1 | 1 | 3 1/4 | 6 | .060 | ● |
| | 7102918 | HA4R8RA1000L325HAR120D | 1 | 1 | 3 1/4 | 6 | .120 | ● |
| | 7102919 | HA4R8RA1000L325HAR190D | 1 | 1 | 3 1/4 | 6 | .190 | ● |
| | 7102920 | HA4R8RA1000L325HAR250D | 1 | 1 | 3 1/4 | 6 | .250 | ● |
| 7102922 | HA4R8RA1000X400HAR030D | 1 | 1 | 4 | 7 | .030 | ● | |
| 7102923 | HA4R8RA1000X400HAR060D | 1 | 1 | 4 | 7 | .060 | ● | |
| 7102924 | HA4R8RA1000X400HAR120D | 1 | 1 | 4 | 7 | .120 | ● | |
| 7102926 | HA4R8RA1000X400HAR190D | 1 | 1 | 4 | 7 | .190 | ● | |
| 7102927 | HA4R8RA1000X400HAR250D | 1 | 1 | 4 | 7 | .250 | ● | |



- Primary
- Secondary

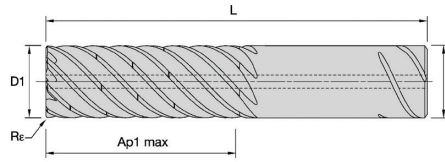
| | | |
|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

HARVI™ IV

Radiused • 8 Flutes • Internal Coolant • Safe-Lock™ Shank • **INCH**

KCSM15A

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | Re | |
|---------|------------------------|------------------------|-----|-------|---------|-------|------|---|
| Inch | 7102484 | HA4R8RA0500S063SLR015I | 1/2 | 1/2 | 5/8 | 3 | .015 | ● |
| | 7102485 | HA4R8RA0500S063SLR030I | 1/2 | 1/2 | 5/8 | 3 | .030 | ● |
| | 7102486 | HA4R8RA0500S063SLR060I | 1/2 | 1/2 | 5/8 | 3 | .060 | ● |
| | 7102487 | HA4R8RA0500S063SLR090I | 1/2 | 1/2 | 5/8 | 3 | .090 | ● |
| | 7102488 | HA4R8RA0500S063SLR120I | 1/2 | 1/2 | 5/8 | 3 | .120 | ● |
| | 7102490 | HA4R8RA0500R100SLR015I | 1/2 | 1/2 | 1 | 3 | .015 | ● |
| | 7102511 | HA4R8RA0500R100SLR030I | 1/2 | 1/2 | 1 | 3 | .030 | ● |
| | 7102512 | HA4R8RA0500R100SLR060I | 1/2 | 1/2 | 1 | 3 | .060 | ● |
| | 7102513 | HA4R8RA0500R100SLR090I | 1/2 | 1/2 | 1 | 3 | .090 | ● |
| | 7102514 | HA4R8RA0500R100SLR120I | 1/2 | 1/2 | 1 | 3 | .120 | ● |
| | 7102516 | HA4R8RA0625S075SLR030I | 5/8 | 5/8 | 3/4 | 3 | .030 | ● |
| | 7102517 | HA4R8RA0625S075SLR060I | 5/8 | 5/8 | 3/4 | 3 | .060 | ● |
| | 7102518 | HA4R8RA0625S075SLR090I | 5/8 | 5/8 | 3/4 | 3 | .090 | ● |
| | 7102519 | HA4R8RA0625S075SLR120I | 5/8 | 5/8 | 3/4 | 3 | .120 | ● |
| | 7102520 | HA4R8RA0625S075SLR190I | 5/8 | 5/8 | 3/4 | 3 | .190 | ● |
| | 7102522 | HA4R8RA0625R125SLR030I | 5/8 | 5/8 | 1 1/4 | 3 1/2 | .030 | ● |
| | 7102523 | HA4R8RA0625R125SLR060I | 5/8 | 5/8 | 1 1/4 | 3 1/2 | .060 | ● |
| | 7102524 | HA4R8RA0625R125SLR090I | 5/8 | 5/8 | 1 1/4 | 3 1/2 | .090 | ● |
| | 7102525 | HA4R8RA0625R125SLR120I | 5/8 | 5/8 | 1 1/4 | 3 1/2 | .120 | ● |
| | 7102526 | HA4R8RA0625R125SLR190I | 5/8 | 5/8 | 1 1/4 | 3 1/2 | .190 | ● |
| | 7102528 | HA4R8RA0750S100SLR030I | 3/4 | 3/4 | 1 | 3 1/2 | .030 | ● |
| | 7102529 | HA4R8RA0750S100SLR060I | 3/4 | 3/4 | 1 | 3 1/2 | .060 | ● |
| | 7102530 | HA4R8RA0750S100SLR090I | 3/4 | 3/4 | 1 | 3 1/2 | .090 | ● |
| | 7102531 | HA4R8RA0750S100SLR120I | 3/4 | 3/4 | 1 | 3 1/2 | .120 | ● |
| | 7102532 | HA4R8RA0750S100SLR190I | 3/4 | 3/4 | 1 | 3 1/2 | .190 | ● |
| | 7102534 | HA4R8RA0750R163SLR030I | 3/4 | 3/4 | 1 5/8 | 4 | .030 | ● |
| | 7102535 | HA4R8RA0750R163SLR060I | 3/4 | 3/4 | 1 5/8 | 4 | .060 | ● |
| | 7102536 | HA4R8RA0750R163SLR090I | 3/4 | 3/4 | 1 5/8 | 4 | .090 | ● |
| | 7102537 | HA4R8RA0750R163SLR120I | 3/4 | 3/4 | 1 5/8 | 4 | .120 | ● |
| | 7102538 | HA4R8RA0750R163SLR190I | 3/4 | 3/4 | 1 5/8 | 4 | .190 | ● |
| | 7102540 | HA4R8RA1000S125SLR030I | 1 | 1 | 1 1/4 | 4 | .030 | ● |
| | 7102541 | HA4R8RA1000S125SLR060I | 1 | 1 | 1 1/4 | 4 | .060 | ● |
| | 7102542 | HA4R8RA1000S125SLR120I | 1 | 1 | 1 1/4 | 4 | .120 | ● |
| | 7102543 | HA4R8RA1000S125SLR190I | 1 | 1 | 1 1/4 | 4 | .190 | ● |
| | 7102544 | HA4R8RA1000S125SLR250I | 1 | 1 | 1 1/4 | 4 | .250 | ● |
| 7102546 | HA4R8RA1000S175SLR030I | 1 | 1 | 1 3/4 | 4 1/2 | .030 | ● | |
| 7102547 | HA4R8RA1000S175SLR060I | 1 | 1 | 1 3/4 | 4 1/2 | .060 | ● | |
| 7102548 | HA4R8RA1000S175SLR120I | 1 | 1 | 1 3/4 | 4 1/2 | .120 | ● | |
| 7102549 | HA4R8RA1000S175SLR190I | 1 | 1 | 1 3/4 | 4 1/2 | .190 | ● | |
| 7102550 | HA4R8RA1000S175SLR250I | 1 | 1 | 1 3/4 | 4 1/2 | .250 | ● | |
| 7102552 | HA4R8RA1000R200SLR030I | 1 | 1 | 2 | 5 | .030 | ● | |
| 7102553 | HA4R8RA1000R200SLR060I | 1 | 1 | 2 | 5 | .060 | ● | |
| 7102554 | HA4R8RA1000R200SLR120I | 1 | 1 | 2 | 5 | .120 | ● | |
| 7102555 | HA4R8RA1000R200SLR190I | 1 | 1 | 2 | 5 | .190 | ● | |
| 7102556 | HA4R8RA1000R200SLR250I | 1 | 1 | 2 | 5 | .250 | ● | |



- Primary
- Secondary

| | | |
|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

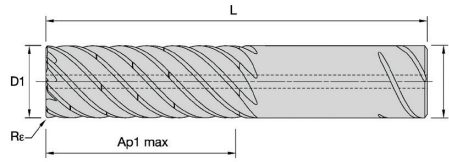
HARVI™ IV

Radiused • 8 Flutes • Chip Splitters • Internal Coolant • Safe-Lock™ Shank • **INCH**

KCSM15A

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | Re | |
|--|--------------|------------------------|-----|-----|---------|-------|------|---|
| | 7102929 | HA4R8RA0500R125SLR030D | 1/2 | 1/2 | 1 1/4 | 3 1/2 | .030 | ● |
| | 7102930 | HA4R8RA0500R125SLR060D | 1/2 | 1/2 | 1 1/4 | 3 1/2 | .060 | ● |
| | 7102931 | HA4R8RA0500R125SLR090D | 1/2 | 1/2 | 1 1/4 | 3 1/2 | .090 | ● |
| | 7102932 | HA4R8RA0500R125SLR120D | 1/2 | 1/2 | 1 1/4 | 3 1/2 | .120 | ● |
| | 7102934 | HA4R8RA0500L163SLR015D | 1/2 | 1/2 | 1 5/8 | 4 | .015 | ● |
| | 7102935 | HA4R8RA0500L163SLR030D | 1/2 | 1/2 | 1 5/8 | 4 | .030 | ● |
| | 7102936 | HA4R8RA0500L163SLR060D | 1/2 | 1/2 | 1 5/8 | 4 | .060 | ● |
| | 7102937 | HA4R8RA0500L163SLR090D | 1/2 | 1/2 | 1 5/8 | 4 | .090 | ● |
| | 7102938 | HA4R8RA0500L163SLR120D | 1/2 | 1/2 | 1 5/8 | 4 | .120 | ● |
| | 7102940 | HA4R8RA0500X200SLR030D | 1/2 | 1/2 | 2 | 4 | .030 | ● |
| | 7102941 | HA4R8RA0500X200SLR060D | 1/2 | 1/2 | 2 | 4 | .060 | ● |
| | 7102942 | HA4R8RA0500X200SLR090D | 1/2 | 1/2 | 2 | 4 | .090 | ● |
| | 7102944 | HA4R8RA0500X200SLR120D | 1/2 | 1/2 | 2 | 4 | .120 | ● |
| | 7102946 | HA4R8RA0625R163SLR030D | 5/8 | 5/8 | 1 5/8 | 4 | .030 | ● |
| | 7102947 | HA4R8RA0625R163SLR060D | 5/8 | 5/8 | 1 5/8 | 4 | .060 | ● |
| | 7102948 | HA4R8RA0625R163SLR090D | 5/8 | 5/8 | 1 5/8 | 4 | .090 | ● |
| | 7102949 | HA4R8RA0625R163SLR120D | 5/8 | 5/8 | 1 5/8 | 4 | .120 | ● |
| | 7102950 | HA4R8RA0625R163SLR190D | 5/8 | 5/8 | 1 5/8 | 4 | .190 | ● |
| | 7102962 | HA4R8RA0625L188SLR030D | 5/8 | 5/8 | 1 7/8 | 4 | .030 | ● |
| | 7102963 | HA4R8RA0625L188SLR060D | 5/8 | 5/8 | 1 7/8 | 4 | .060 | ● |
| | 7102964 | HA4R8RA0625L188SLR090D | 5/8 | 5/8 | 1 7/8 | 4 | .090 | ● |
| | 7102965 | HA4R8RA0625L188SLR120D | 5/8 | 5/8 | 1 7/8 | 4 | .120 | ● |
| | 7102967 | HA4R8RA0625L188SLR190D | 5/8 | 5/8 | 1 7/8 | 4 | .190 | ● |
| | 7102969 | HA4R8RA0625X250SLR030D | 5/8 | 5/8 | 2 1/2 | 5 | .030 | ● |
| | 7102970 | HA4R8RA0625X250SLR060D | 5/8 | 5/8 | 2 1/2 | 5 | .060 | ● |
| | 7102991 | HA4R8RA0625X250SLR090D | 5/8 | 5/8 | 2 1/2 | 5 | .090 | ● |
| | 7102992 | HA4R8RA0625X250SLR120D | 5/8 | 5/8 | 2 1/2 | 5 | .120 | ● |
| | 7102993 | HA4R8RA0625X250SLR190D | 5/8 | 5/8 | 2 1/2 | 5 | .190 | ● |
| | 7102995 | HA4R8RA0750R163SLR030D | 3/4 | 3/4 | 1 5/8 | 4 | .030 | ● |
| | 7102996 | HA4R8RA0750R163SLR060D | 3/4 | 3/4 | 1 5/8 | 4 | .060 | ● |
| | 7102997 | HA4R8RA0750R163SLR090D | 3/4 | 3/4 | 1 5/8 | 4 | .090 | ● |
| | 7102998 | HA4R8RA0750R163SLR120D | 3/4 | 3/4 | 1 5/8 | 4 | .120 | ● |
| | 7102999 | HA4R8RA0750R163SLR190D | 3/4 | 3/4 | 1 5/8 | 4 | .190 | ● |
| | 7103001 | HA4R8RA0750L225SLR030D | 3/4 | 3/4 | 2 1/4 | 5 | .030 | ● |
| | 7103003 | HA4R8RA0750L225SLR060D | 3/4 | 3/4 | 2 1/4 | 5 | .060 | ● |
| | 7103004 | HA4R8RA0750L225SLR090D | 3/4 | 3/4 | 2 1/4 | 5 | .090 | ● |
| | 7103005 | HA4R8RA0750L225SLR120D | 3/4 | 3/4 | 2 1/4 | 5 | .120 | ● |
| | 7103006 | HA4R8RA0750L225SLR190D | 3/4 | 3/4 | 2 1/4 | 5 | .190 | ● |
| | 7103009 | HA4R8RA0750X325SLR030D | 3/4 | 3/4 | 3 1/4 | 6 | .030 | ● |
| | 7103010 | HA4R8RA0750X325SLR060D | 3/4 | 3/4 | 3 1/4 | 6 | .060 | ● |
| | 7103021 | HA4R8RA0750X325SLR090D | 3/4 | 3/4 | 3 1/4 | 6 | .090 | ● |
| | 7103022 | HA4R8RA0750X325SLR120D | 3/4 | 3/4 | 3 1/4 | 6 | .120 | ● |
| | 7103023 | HA4R8RA0750X325SLR190D | 3/4 | 3/4 | 3 1/4 | 6 | .190 | ● |

Inch



- Primary
- Secondary

| | | |
|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

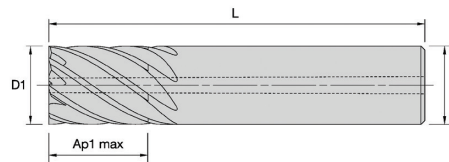
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HARVI™ IV

Radiused • 8 Flutes • Chip Splitters • Internal Coolant • Safe-Lock™ Shank • **INCH**

KCSM15A

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | Rε | |
|------|--------------|------------------------|----|---|---------|-------|------|---|
| Inch | 7103025 | HA4R8RA1000R250SLR030D | 1 | 1 | 2 1/2 | 5 1/2 | .030 | ● |
| | 7103026 | HA4R8RA1000R250SLR060D | 1 | 1 | 2 1/2 | 5 1/2 | .060 | ● |
| | 7103027 | HA4R8RA1000R250SLR120D | 1 | 1 | 2 1/2 | 5 1/2 | .120 | ● |
| | 7103029 | HA4R8RA1000R250SLR190D | 1 | 1 | 2 1/2 | 5 1/2 | .190 | ● |
| | 7103030 | HA4R8RA1000R250SLR250D | 1 | 1 | 2 1/2 | 5 1/2 | .250 | ● |
| | 7103032 | HA4R8RA1000L325SLR030D | 1 | 1 | 3 1/4 | 6 | .030 | ● |
| | 7103033 | HA4R8RA1000L325SLR060D | 1 | 1 | 3 1/4 | 6 | .060 | ● |
| | 7103034 | HA4R8RA1000L325SLR120D | 1 | 1 | 3 1/4 | 6 | .120 | ● |
| | 7103035 | HA4R8RA1000L325SLR190D | 1 | 1 | 3 1/4 | 6 | .190 | ● |
| | 7103036 | HA4R8RA1000L325SLR250D | 1 | 1 | 3 1/4 | 6 | .250 | ● |
| | 7103038 | HA4R8RA1000X400SLR030D | 1 | 1 | 4 | 7 | .030 | ● |
| | 7103039 | HA4R8RA1000X400SLR060D | 1 | 1 | 4 | 7 | .060 | ● |
| | 7103040 | HA4R8RA1000X400SLR120D | 1 | 1 | 4 | 7 | .120 | ● |
| | 7103042 | HA4R8RA1000X400SLR190D | 1 | 1 | 4 | 7 | .190 | ● |
| | 7103043 | HA4R8RA1000X400SLR250D | 1 | 1 | 4 | 7 | .250 | ● |



- Primary
- Secondary

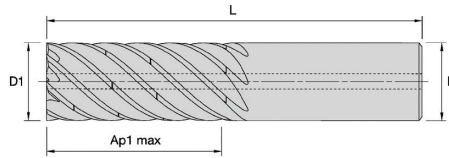
| | | |
|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

HARVI™ IV

Square End • 8 Flutes • Internal Coolant • Plain Shank • **INCH**

KCSM15A

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | |
|------|--------------|--------------------|-----|-----|---------|-------|---|
| Inch | 7102422 | HA4R8SE0375S050HAI | 3/8 | 3/8 | 1/2 | 2 1/2 | ● |
| | 7102426 | HA4R8SE0375R075HAI | 3/8 | 3/8 | 3/4 | 2 1/2 | ● |
| | 7102432 | HA4R8SE0500S063HAI | 1/2 | 1/2 | 5/8 | 3 | ● |
| | 7102438 | HA4R8SE0500R100HAI | 1/2 | 1/2 | 1 | 3 | ● |
| | 7102447 | HA4R8SE0625S075HAI | 5/8 | 5/8 | 3/4 | 3 | ● |
| | 7102453 | HA4R8SE0625R125HAI | 5/8 | 5/8 | 1 1/4 | 3 1/2 | ● |
| | 7102459 | HA4R8SE0750S100HAI | 3/4 | 3/4 | 1 | 3 1/2 | ● |
| | 7102465 | HA4R8SE0750R163HAI | 3/4 | 3/4 | 1 5/8 | 4 | ● |
| | 7102483 | HA4R8SE1000R200HAI | 1 | 1 | 2 | 5 | ● |
| | 7102471 | HA4R8SE1000S125HAI | 1 | 1 | 1 1/4 | 4 | ● |
| | 7102477 | HA4R8SE1000S175HAI | 1 | 1 | 1 3/4 | 4 1/2 | ● |



- Primary
- Secondary

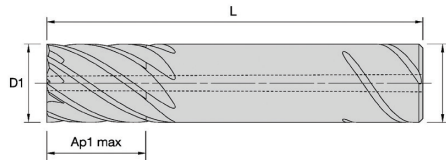
| | | |
|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

HARVI™ IV

Square End • 8 Flutes • Chip Splitters • Internal Coolant • Plain Shank • **INCH**

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | |
|------|--------------|--------------------|-----|-----|---------|-------|---|
| Inch | 7102839 | HA4R8SE0375R100HAD | 3/8 | 3/8 | 1 | 3 | ● |
| | 7102853 | HA4R8SE0375L125HAD | 3/8 | 3/8 | 1 1/4 | 3 | ● |
| | 7102856 | HA4R8SE0375X150HAD | 3/8 | 3/8 | 1 1/2 | 3 1/2 | ● |
| | 7102861 | HA4R8SE0500R125HAD | 1/2 | 1/2 | 1 1/4 | 3 1/2 | ● |
| | 7102867 | HA4R8SE0500L163HAD | 1/2 | 1/2 | 1 5/8 | 4 | ● |
| | 7102872 | HA4R8SE0500X200HAD | 1/2 | 1/2 | 2 | 4 | ● |
| | 7102878 | HA4R8SE0625R163HAD | 5/8 | 5/8 | 1 5/8 | 4 | ● |
| | 7102884 | HA4R8SE0625L188HAD | 5/8 | 5/8 | 1 7/8 | 4 | ● |
| | 7102890 | HA4R8SE0625X250HAD | 5/8 | 5/8 | 2 1/2 | 5 | ● |
| | 7102896 | HA4R8SE0750R163HAD | 3/4 | 3/4 | 1 5/8 | 4 | ● |
| | 7102902 | HA4R8SE0750L225HAD | 3/4 | 3/4 | 2 1/4 | 5 | ● |
| | 7102909 | HA4R8SE0750X325HAD | 3/4 | 3/4 | 3 1/4 | 6 | ● |
| | 7102915 | HA4R8SE1000R250HAD | 1 | 1 | 2 1/2 | 5 1/2 | ● |
| | 7102921 | HA4R8SE1000L325HAD | 1 | 1 | 3 1/4 | 6 | ● |
| | 7102928 | HA4R8SE1000X400HAD | 1 | 1 | 4 | 7 | ● |

KCSM15A



- Primary
- Secondary

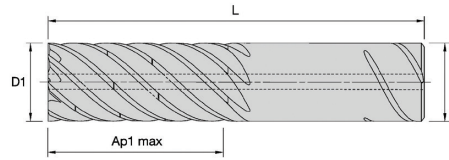
| | | |
|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

HARVI™ IV

Square End • 8 Flutes • Internal Coolant • Safe-Lock™ Shank • **INCH**

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | |
|------|--------------|--------------------|-----|-----|---------|-------|---|
| Inch | 7102489 | HA4R8SE0500S063SLI | 1/2 | 1/2 | 5/8 | 3 | ● |
| | 7102515 | HA4R8SE0500R100SLI | 1/2 | 1/2 | 1 | 3 | ● |
| | 7102521 | HA4R8SE0625S075SLI | 5/8 | 5/8 | 3/4 | 3 | ● |
| | 7102527 | HA4R8SE0625R125SLI | 5/8 | 5/8 | 1 1/4 | 3 1/2 | ● |
| | 7102533 | HA4R8SE0750S100SLI | 3/4 | 3/4 | 1 | 3 1/2 | ● |
| | 7102539 | HA4R8SE0750R163SLI | 3/4 | 3/4 | 1 5/8 | 4 | ● |
| | 7102545 | HA4R8SE1000S125SLI | 1 | 1 | 1 1/4 | 4 | ● |
| | 7102551 | HA4R8SE1000S175SLI | 1 | 1 | 1 3/4 | 4 1/2 | ● |
| | 7102557 | HA4R8SE1000R200SLI | 1 | 1 | 2 | 5 | ● |

KCSM15A



- Primary
- Secondary

| | | |
|---|--------|---|
| P | Blue | ○ |
| M | Yellow | ● |
| K | Red | ○ |
| N | Green | ○ |
| S | Orange | ● |
| H | Grey | ○ |

HARVI™ IV

Square End • 8 Flutes • Chip Splitters • Internal Coolant • Safe-Lock™ Shank • **INCH**

KCSM15A

| | Order Number | Catalog Number | D1 | D | Ap1 Max | L | |
|-------------|--------------|--------------------|-----|-----|---------|-------|---|
| Inch | 7102933 | HA4R8SE0500R125SLD | 1/2 | 1/2 | 1 1/4 | 3 1/2 | ● |
| | 7102939 | HA4R8SE0500L163SLD | 1/2 | 1/2 | 1 5/8 | 4 | ● |
| | 7102945 | HA4R8SE0500X200SLD | 1/2 | 1/2 | 2 | 4 | ● |
| | 7102961 | HA4R8SE0625R163SLD | 5/8 | 5/8 | 1 5/8 | 4 | ● |
| | 7102968 | HA4R8SE0625L188SLD | 5/8 | 5/8 | 1 7/8 | 4 | ● |
| | 7102994 | HA4R8SE0625X250SLD | 5/8 | 5/8 | 2 1/2 | 5 | ● |
| | 7103000 | HA4R8SE0750R163SLD | 3/4 | 3/4 | 1 5/8 | 4 | ● |
| | 7103007 | HA4R8SE0750L225SLD | 3/4 | 3/4 | 2 1/4 | 5 | ● |
| | 7103024 | HA4R8SE0750X325SLD | 3/4 | 3/4 | 3 1/4 | 6 | ● |
| | 7103031 | HA4R8SE1000R250SLD | 1 | 1 | 2 1/2 | 5 1/2 | ● |
| | 7103037 | HA4R8SE1000L325SLD | 1 | 1 | 3 1/4 | 6 | ● |
| | 7103044 | HA4R8SE1000X400SLD | 1 | 1 | 4 | 7 | ● |

HARVI™ IV • Side Milling/Slotting • Application Data • **INCH**

| Material Group | Max Ae Factor (KAp) | KCSM15A Base Cutting Speed Vc SFM | Recommended Base Feed per Tooth Value (IPT=Inch/tooth) | | | | | | |
|----------------|---------------------|--------------------------------------|--|-------|--------|--------|--------|--------|--------|
| | | | D1 - Diameter | | | | | | |
| | | | frac. | 3/8 | 1/2 | 5/8 | 3/4 | 1 | |
| | | | dec. | 0.375 | 0.5 | 0.625 | 0.75 | 1 | |
| P | 3 | 1 | 420 | IPT | 0.0018 | 0.0023 | 0.0027 | 0.003 | 0.0037 |
| | 4 | 1 | 320 | IPT | 0.0016 | 0.0021 | 0.0024 | 0.0026 | 0.0031 |
| | 5 | 0.8 | 210 | IPT | 0.0014 | 0.0018 | 0.0022 | 0.0024 | 0.0029 |
| | 6 | 0.7 | 160 | IPT | 0.0012 | 0.0015 | 0.0018 | 0.0019 | 0.0022 |
| M | 1 | 1 | 275 | IPT | 0.0018 | 0.0023 | 0.0027 | 0.003 | 0.0037 |
| | 2 | 0.8 | 200 | IPT | 0.0014 | 0.0018 | 0.0022 | 0.0024 | 0.0029 |
| | 3 | 0.8 | 200 | IPT | 0.0012 | 0.0015 | 0.0018 | 0.0019 | 0.0022 |
| S | 1 | 0.5 | 160 | IPT | 0.0018 | 0.0023 | 0.0027 | 0.003 | 0.0037 |
| | 2 | 0.5 | 100 | IPT | 0.0014 | 0.0018 | 0.0022 | 0.0024 | 0.0029 |
| | 3 | 0.5 | 80 | IPT | 0.001 | 0.0013 | 0.0014 | 0.0016 | 0.002 |
| | 4 | 0.7 | 160 | IPT | 0.0016 | 0.002 | 0.0024 | 0.0027 | 0.0032 |
| H | 1 | 0.8 | 260 | IPT | 0.0016 | 0.0021 | 0.0024 | 0.0026 | 0.0031 |
| | 2 | 0.5 | 230 | IPT | 0.0014 | 0.0018 | 0.002 | 0.0022 | 0.0026 |

NOTE:

These guidelines may require variations to achieve optimum results.

Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on >1/2" diameter. Maximum ramp angle is 2°.

Tools with chip splitters can be used as finishers.

Maximum Cutting Width and Adjustment Factors for Speed & Feed Calculation • **INCH**

Maximum cutting width (Ae) for given cutting depth (Ap)

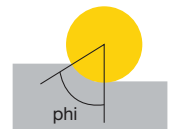
| Ap | ≤0.125 x D1 | >0.125xD1 ≤ .5xD1 | >0.5xD1 ≤ 1xD1 | >1xD1 ≤ 2xD1 | >2xD1 ≤ 3xD1 | >3xD1 ≤ 4xD1 | >4 x D1 |
|--------|-------------|-------------------|----------------|----------------|----------------|----------------|----------------|
| Max Ae | 100% x D1 | 50% x D1 x KAp | 40% x D1 x KAp | 30% x D1 x KAp | 20% x D1 x KAp | 15% x D1 x KAp | 10% x D1 x KAp |

Adjustment factors for speed (Vc) and feed (Fz)

| Ae/D1 | ≤2% | >2% ≤ 5% | >5 ≤ 7.5% | >7.5% ≤ 10% | >10% ≤ 15% | >15% ≤ 20% | >20% ≤ 30% | >30% ≤ 40% | >40% ≤ 50% | >50% ≤ 100% |
|-------|------|----------|-----------|-------------|------------|------------|------------|------------|------------|-------------|
| Kv | 3 | 2.5 | 1.9 | 1.4 | 1.35 | 1.3 | 1.2 | 1.1 | 1 | 0.9 |
| KFz | 3.28 | 2.3 | 1.95 | 1.7 | 1.5 | 1.25 | 1.09 | 1.02 | 1 | 1 |

Angle of engagement (phi°) relative to cutting width (Ae)

| Ae | 2% | 5% | 7.50% | 10% | 15% | 20% | 30% | 40% | 50% | 100% |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-----|------|
| phi° | 16.26 | 25.84 | 31.79 | 36.87 | 45.57 | 53.13 | 66.42 | 78.46 | 90 | 180 |



To calculate application specific cutting data, please use KAp, Kv, and Kfz from tables above for adaption of cutting speeds and feeds respectively:

Maximum Ae= KAp * D1 * Ap1Max/D1
 Vc new = Vc * Kv
 IPT new = IPT * KFz

Sample Calculation

Material: S4
 D1: 1"
 Ap: 2xD1

| | |
|------------------------|------------------------|
| Max Ae: 30% x Kap x D1 | 30% x .7 x D1 = 21%xD1 |
| SFM: Base x Kv | 160 x 1.2 = 192 |
| IPT: Base x KFz | .0032 x 1.09 = .0035 |

Final cutting data recommendation:

Max Ae = 30% * 0.7 * 1 = 0.21"
 Vc new = 160 * 1.2 = 192 SFM
 IPT new = 0.0032 * 1.09 = .0035 IPT

Application Data • Minimum Helical Interpolation Diameter • **INCH**

| Tool. dia. inch | Interpolation dia. inch |
|-----------------|-------------------------|
| 3/8 | 0.54 |
| 1/2 | 0.67 |
| 5/8 | 0.83 |
| 3/4 | 1.00 |
| 1 | 1.29 |

Maximum ramp angle is 2° on centerline.

HARVI™ IV • Catalog Numbering System

Each character in our catalog number signifies a specific trait of that product. Use the following key columns to easily identify which attributes apply.

| HA4R8SE1000X040HADM | | | | | | | | | | |
|---|--------------------|-------------------------|------------------------------|--------------------------------|-----------------------------------|--------------------|------------------|-----------------|---|-----------------|
| HA4R | 8 | SE | 1000 | X | 040 | HA | | | D | M |
| Series | Number of Flutes | Front End Style | Cutting Diameter D1 | Flute Section Style | Length of Cut Ap1 | Shank Style | Radius | Radius | Specific Features | Standard |
| H1TE = HARVI I TE | 1 = 1-Flute | SE = Sharp Edge | Metric = D1 in mm | N = Neck | Metric = Ap1 Max in mm | HA = Plain | Radius Metric | Radius Inch | C = Chip Splitter | M = Metric |
| HA2L = HARVI II Long | 2 = 2-Flute | CH = Chamfer | Inch = D1 in decimal inch | E = Extended Neck | Inch = Ap1 Max in decimal inch | HB = Weldon® | R020 = 0,2mm | R010 = .010" | I = Internal Coolant | Blank = Inch |
| HA3R = HARVI III | 3 = 3-Flute | RA = Radius | | S = Short Without Neck | | SL = Safe-Lock™ | R025 = 0,25mm | R015 = .015" | O = Coolant Grooves in Shank | |
| HA3A = HARVI III Aero | 4 = 4-Flute | BN = Ball Nose | | R = Regular Without Neck | | DL = DUO-LOCK™ | R030 = 0,3mm | R030 = .030" | P = Polished | |
| HA4R = HARVI IV | 5 = 5-Flute | TB = Taper Ball Nose | | L = Long Without Neck | | | R040 = 0,4mm | R060 = .060" | D = Chip Splitter & Internal Coolant | |
| RSMF = RSM II | 6 = 6-Flute | TO = Torroid | | X = Extra Long Without Neck | | | R050 = 0,5mm | R090 = .090" | | |
| KOR = KOR | 7 = 7-Flute | | | | | | R075 = 0,75mm | R120 = .120" | | |
| ALCB = Basic PCD End Mill with Carbide Body | 8 = 8-Flute | | | | | | R100 = 1,0mm | R160 = .160" | | |
| | 9 = 9-Flute | | | | | | R125 = 1,25mm | R250 = .250" | | |
| ALCC = Complex PCD End Mill with Carbide Body | M = Multi-flute | | | | | | R150 = 1,5mm | R190 = .190" | | |
| | | | | | | | R200 = 2,0mm | R375 = .375" | | |
| ALCR = Roughing PCD End Mill with Carbide Body | | | | | | | R250 = 2,5mm | R045 = .045" | | |
| | | | | | | | R300 = 3,0mm | | | |
| ALSB = Brazed PCD with Carbide Body | | | | | | | R400 = 4,0mm | | | |
| | | | | | | | R500 = 5,0mm | | | |
| ALSR = Helical Brazed PCD with Carbide Body | | | | | | | R600 = 6,0mm | | | |

Level Up with 8 Flutes.

When you're creating in the aerospace and defense, medical, energy and general engineering industries, you need one tool that can withstand the most challenging materials—no more stopping for tool changes between cuts. Prepare to get unfamiliar with downtime.



Our Story Is One of Continuous Innovation

It starts in 1936 with our founder, metallurgist Philip M. McKenna, who after years of research created a tungsten-titanium carbide alloy specifically for cutting tools. That single development not only led to a new class of machining tools that cut faster, lasted longer and drove productivity in everything from the automobile to the airplane, but also led to the opening of McKenna Metals Company in Latrobe, Pennsylvania, United States. Today, that company is Kennametal Inc.—a recognized leader in metalworking serving customers across continents and industries including transportation, construction, aerospace, machining and cutting, energy and general engineering. We have a reputation for building innovative solutions for our customers' most challenging applications. The name Kennametal is synonymous for high-quality, high-performance tools that can withstand the most strenuous conditions and bring ease to a wide range of machining operations. We help our customers' operations run longer, faster and with greater precision. We don't cut corners. We cut metal. Your toughest materials don't stand a chance.

Your toughest materials don't stand a chance.



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