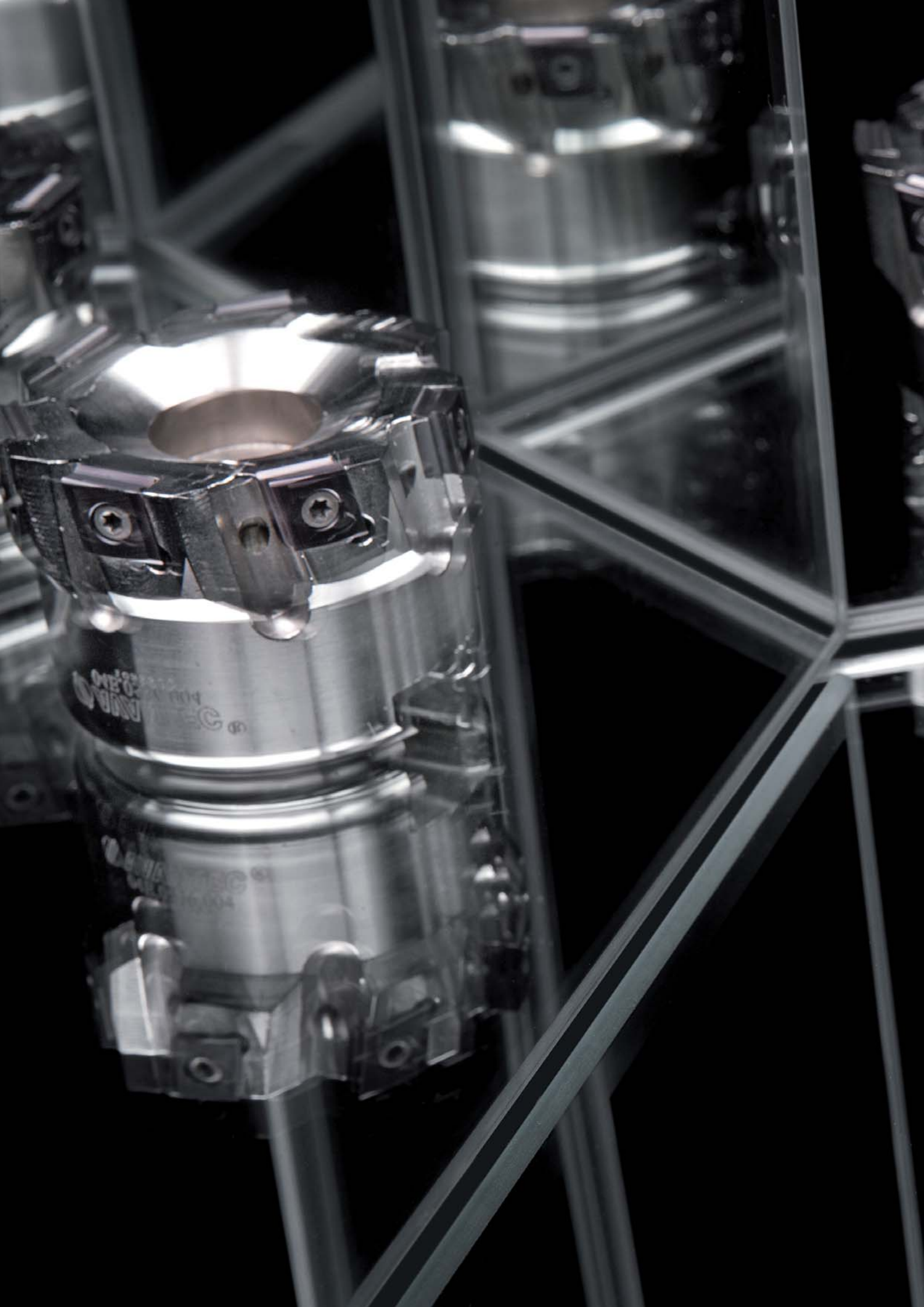
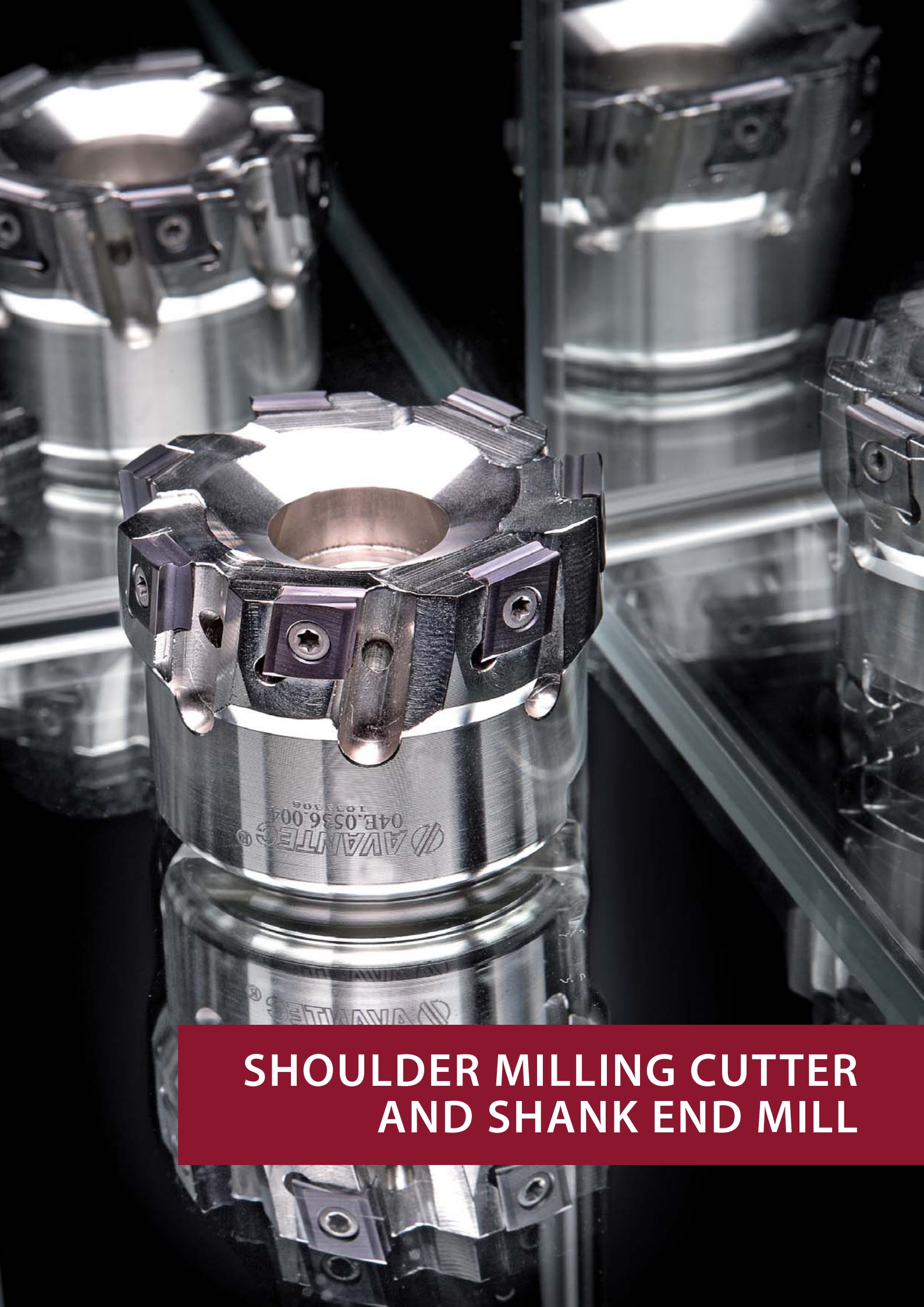
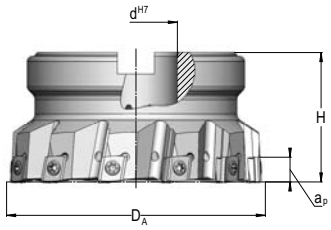





# SHOULDER MILLING CUTTER AND SHANK END MILL

# Shoulder milling cutter EP90/EV90

< highest brake resistance because of tangential build in 4 cutting edge EN insert
< high DOC and high feed rates at once
< EV90: fine pitch brings advantage for cast iron machining

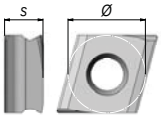



**Shoulder milling cutter EP90**

| article | D | H | $d^{H7}$ | $z_{eff}$ | $a_p$ | ic | Kg | insert |
|---|---|---|---|---|---|---|---|---|
| 04E.0432.001 | 40 | 32 | 16 | 5 | 7,5 | yes | 0,18 | EN..08T3.L |
| 04E.0536.001 | 50 | 36 | 22 | 5 | 9,0 | yes | 0,31 | EN..0904.L |
| 04E.0640.005 | 63 | 40 | 22 | 5 | 12,0 | yes | 0,52 | EN..1206.L |
| 04E.0850.001 | 80 | 50 | 27 | 7 | 12,0 | yes | 1,06 | EN..1206.L |
| 04E.1050.001 | 100 | 50 | 32 | 8 | 12,0 | yes | 1,76 | EN..1206.L |
| 04E.1263.001 | 125 | 63 | 40 | 10 | 12,0 | yes | 3,13 | EN..1206.L |

**Shoulder milling cutter EV90**

| article | D | H | $d^{H7}$ | $z_{eff}$ | $a_p$ | ic | Kg | insert |
|---|---|---|---|---|---|---|---|---|
| 04E.0432.002 | 40 | 32 | 16 | 6 | 7,5 | yes | 0,20 | EN..08T3.L |
| 04E.0536.004 | 50 | 36 | 22 | 7 | 7,5 | yes | 0,32 | EN..08T3.L |
| 04E.0640.001 | 63 | 40 | 22 | 7 | 9,0 | yes | 0,54 | EN..0904.L |
| 04E.0640.006 | 63 | 40 | 22 | 9 | 7,5 | yes | 0,57 | EN..08T3.L |
| 04E.0850.004 | 80 | 50 | 27 | 10 | 9,0 | yes | 1,09 | EN..0904.L |
| 04E.0850.016 | 80 | 50 | 27 | 12 | 7,5 | yes | 1,12 | EN..08T3.L |
| 04E.1050.003 | 100 | 50 | 32 | 12 | 9,0 | yes | 1,77 | EN..0904.L |
| 04E.1050.004 | 100 | 50 | 32 | 12 | 12,0 | yes | 1,82 | EN..1206.L |
| 04E.1263.003 | 125 | 63 | 40 | 13 | 9,0 | yes | 3,16 | EN..0904.L |
| 04E.1263.007 | 125 | 63 | 40 | 15 | 12,0 | yes | 3,16 | EN..1206.L |




| insert | incircle diameter | | insert thickness | |
|---|---|---|---|---|
| | ø 08 = | 8,00 | S T3 = | 3,97 |
| | ø 09 = | 9,52 | S 04 = | 4,76 |
| | ø 12 = | 12,70 | S 06 = | 6,35 |

## Allocation from machining parameters of AV material groups

| | | | | | cast iron | | | steel | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | article | AS | grade | | D20 | D18 | D17 | A22 | A20 | A18 | A16 | B15 | B14 |
| EN..08T3.. | ENHQ08T30601209SL28W | 4 | SKY77 | $h_{max}$ | 0,15 | 0,12 | 0,1 | 0,15 | 0,15 | 0,12 | 0,1 | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 240 | 230 | 220 | | |
| | | | NERO26 | $h_{max}$ | 0,15 | 0,12 | 0,1 | | | | | | |
| | | | | $v_c$ | 280 | 270 | 260 | | | | | | |
| | ENHQ08T30601726SL28V | 4 | SKY77 | $h_{max}$ | 0,15 | 0,12 | 0,1 | 0,15 | 0,15 | 0,12 | 0,1 | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 240 | 230 | 220 | | |
| | | | NERO26 | $h_{max}$ | 0,15 | 0,12 | 0,1 | | | | | | |
| | | | | $v_c$ | 280 | 270 | 260 | | | | | | |
| | ENHQ08T30600154SL30 | 4 | SKY77 | $h_{max}$ | 0,1 | 0,09 | 0,08 | 0,1 | 0,1 | 0,09 | 0,08 | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 240 | 230 | 220 | | |
| | ENHQ08T30600156EL33 | 4 | DELPH43 | $h_{max}$ | | | | | 0,1 | 0,09 | 0,08 | 0,08 | 0,07 |
| | | | | $v_c$ | | | | | 180 | 150 | 100 | 90 | 80 |
| | | | ICE43 | $h_{max}$ | | | | | 0,1 | 0,09 | 0,08 | 0,08 | 0,07 |
| | | | | $v_c$ | | | | | 180 | 150 | 100 | 90 | 80 |
| | ENFQ08T30603101EL33S* | 1 | SKY77 | $h_{max}$ | 0,15 | 0,12 | 0,1 | 0,15 | 0,15 | 0,12 | 0,1 | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 240 | 230 | 220 | | |
| | | | NERO26 | $h_{max}$ | 0,15 | 0,12 | 0,1 | | | | | | |
| | | | | $v_c$ | 280 | 270 | 260 | | | | | | |
| EN..0904.. | ENHQ09040802312SL28W | 4 | SKY77 | $h_{max}$ | 0,18 | 0,15 | 0,12 | 0,18 | 0,15 | 0,13 | 0,11 | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 240 | 230 | 220 | | |
| | | | NERO26 | $h_{max}$ | 0,18 | 0,15 | 0,12 | | | | | | |
| | | | | $v_c$ | 280 | 270 | 260 | | | | | | |
| | ENHQ09040801726SL28V | 4 | SKY77 | $h_{max}$ | 0,18 | 0,15 | 0,12 | 0,18 | 0,15 | 0,13 | 0,11 | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 240 | 230 | 220 | | |
| | | | NERO26 | $h_{max}$ | 0,18 | 0,15 | 0,12 | | | | | | |
| | | | | $v_c$ | 280 | 270 | 260 | | | | | | |
| | ENHQ09040800354SL30 | 4 | SKY77 | $h_{max}$ | | | | 0,13 | 0,12 | 0,1 | 0,08 | 0,08 | 0,07 |
| | | | | $v_c$ | | | | 180 | 160 | 130 | 100 | 90 | 80 |
| | ENHQ09040800356EL33 | 4 | DELPH43 | $h_{max}$ | | | | | | 0,08 | 0,06 | 0,06 | 0,05 |
| | | | | $v_c$ | | | | | | 130 | 100 | 90 | 80 |
| | | | ICE43 | $h_{max}$ | | | | | | 0,08 | 0,06 | 0,06 | 0,05 |
| | | | | $v_c$ | | | | | | 130 | 100 | 90 | 80 |
| | ENFQ09040803302EL33S* | 1 | SKY77 | $h_{max}$ | 0,18 | 0,15 | 0,12 | 0,18 | 0,15 | 0,13 | 0,11 | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 240 | 230 | 220 | | |

* wiper insert, only one insert per tool required. Only in combination with geometry -28W.

## Allocation from machining parameters of AV material groups

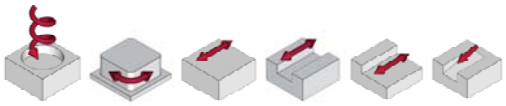
| | | | | | cast iron | | | steel | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | article | AS | grade | | D20 | D18 | D17 | A22 | A20 | A18 | A16 | B15 | B14 |
| EN..1206.. | ENHQ12061002718SL25V | 4 | SKY77 | $h_{max}$ | 0,25 | 0,2 | 0,18 | 0,22 | 0,2 | 0,18 | | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 230 | 220 | | | |
| | | | NERO26 | $h_{max}$ | 0,25 | 0,2 | 0,18 | | | | | | |
| | | | | $v_c$ | 280 | 270 | 260 | | | | | | |
| | | | $CAN^2 77$ | $h_{max}$ | 0,25 | 0,2 | 0,18 | | | | | | |
| | | | | $v_c$ | 400 | 380 | 360 | | | | | | |
| | ENHQ12061002913SL28W | 4 | SKY77 | $h_{max}$ | 0,22 | 0,2 | 0,18 | 0,22 | 0,2 | 0,18 | | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 230 | 220 | | | |
| | | | NERO26 | $h_{max}$ | 0,22 | 0,2 | 0,18 | | | | | | |
| | | | | $v_c$ | 280 | 270 | 260 | | | | | | |
| | ENHQ12061000352SL28 | 4 | SKY77 | $h_{max}$ | 0,22 | 0,2 | 0,18 | 0,22 | 0,2 | 0,18 | 0,15 | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 240 | 230 | 210 | | |
| | ENHQ12061000354SL30 | 4 | SKY77 | $h_{max}$ | 0,18 | 0,15 | 0,14 | 0,18 | 0,16 | 0,15 | 0,12 | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 230 | 220 | 180 | | |
| | ENFQ12061003501EL33S* | 1 | SKY77 | $h_{max}$ | 0,22 | 0,2 | 0,18 | 0,22 | 0,2 | 0,18 | | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 230 | 220 | | | |

* wiper insert, only one insert per tool required. Only in combination with geometry -28W.

| insert | | |
|---|---|---|
| EN..08T3.L | 08B.0309.7991 | TX208 |
| EN..0904.L | 08B.3509.7991 | TX215 |
| EN..1206.L | 08B.0513.7991 | TX220 |

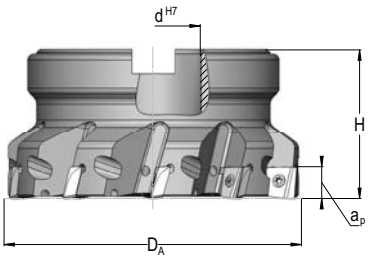
» Assembly instructions page 114

# Megavant HC90



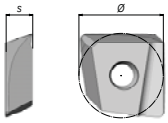
< specially qualified to machine difficult materials (stainless, titanium etc.)

< high feed rates and DOC for the 90 degree shoulder machining




**Megavant HC90**

| article | D | H | $d^{H7}$ | $z_{eff}$ | $a_p$ | ramp | ic | Kg | insert |
|---|---|---|---|---|---|---|---|---|---|
| 04M.0432.150 | 40 | 32 | 16 | 5 | 8,0 | 1,0° | yes | 0,16 | MO..1003.R |
| 04M.0540.150 | 50 | 40 | 22 | 6 | 8,0 | 0,8° | yes | 0,32 | MO..1003.R |
| 04M.0540.080 | 50 | 40 | 22 | 6 | 10,0 | 1,1° | yes | 0,32 | MO..12T3.R |
| 04M.0640.080 | 63 | 40 | 22 | 7 | 10,0 | 0,8° | yes | 0,50 | MO..12T3.R |
| 04M.0850.080 | 80 | 50 | 27 | 9 | 10,0 | 0,6° | yes | 1,03 | MO..12T3.R |
| 04M.1050.080 | 100 | 50 | 32 | 10 | 10,0 | 0,5° | yes | 1,70 | MO..12T3.R |




| insert | incircle diameter | insert thickness |
|---|---|---|
| | ø 10 = 10,00 | S 03 = 3,60 |
| | ø 12 = 12,70 | S T3 = 4,00 |

## Allocation from machining parameters of AV material groups

| | article | AS | grade | | cast iron | | | steel | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | D20 | D18 | D17 | A22 | A20 | A18 | A16 | B15 | B14 |
| MO..1003.. | MOGU10031003104TR28 | 2 | SKY77 | $h_{max}$ | 0,18 | 0,15 | 0,14 | 0,18 | 0,16 | 0,15 | 0,12 | 0,1 | 0,08 |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 230 | 220 | 180 | 160 | 140 |
| MO..12T3.. | MO.12T3.081.01TR28 | 2 | SKY77 | $h_{max}$ | 0,25 | 0,2 | 0,18 | 0,22 | 0,2 | 0,18 | | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 230 | 220 | | | |
| | | | AV1077 | $h_{max}$ | | | | 0,18 | 0,16 | 0,15 | 0,12 | 0,1 | 0,08 |
| | | | | $v_c$ | | | | 240 | 230 | 220 | 180 | 160 | 140 |
| | MOGU12T31008102TR30 | | ICE$^2$77 | $h_{max}$ | 0,16 | 0,13 | 0,11 | 0,16 | 0,15 | 0,13 | 0,11 | 0,1 | 0,08 |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 230 | 220 | 180 | 160 | 140 |
| | MOGU12T31008103SR30 | | DELPH43 | $h_{max}$ | | | | 0,16 | 0,15 | 0,13 | 0,11 | 0,1 | 0,08 |
| | | | | $v_c$ | | | | 240 | 230 | 220 | 180 | 160 | 140 |

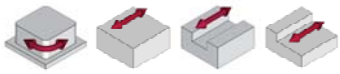
## Allocation from machining parameters of AV material groups

| | article | AS | grade | | stainless steel | | | titanium | aluminium |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | C11 | C10 | C09 | C08 | E80 |
| MO..1003.. | MOGU10031003104TR28 | 2 | SKY77 | $h_{max}$ | | | | 0,08 | 0,15 |
| | | | | $v_c$ | | | | 60-70 | 250-650 |
| MO..12T3.. | MO.12T3.081.01TR28 | 2 | SKY77 | $h_{max}$ | | | | 0,1 | 0,3 |
| | | | | $v_c$ | | | | 60-70 | 250-650 |
| | | | AV1077 | $h_{max}$ | | | | | |
| | | | | $v_c$ | | | | | |
| | MOGU12T31008102TR30 | | ICE$^2$77 | $h_{max}$ | 0,1 | 0,08 | 0,07 | 0,08 | 0,25 |
| | | | | $v_c$ | 100 | 90 | 80 | 60-70 | 250-650 |
| | MOGU12T31008103SR30 | | DELPH43 | $h_{max}$ | 0,1 | 0,08 | 0,07 | 0,08 | 0,25 |
| | | | | $v_c$ | 100 | 90 | 80 | 60-70 | 250-650 |

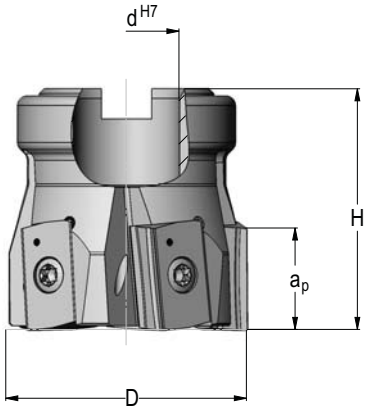
| insert | | |
|---|---|---|
| MO..1003.R | 08B.0309.001 | TX208 |
| MO..12T3.R | 08B.0309.001 | TX208 |

»Technical information for ramp page 109

# Shoulder milling cutter LN90



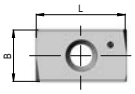
< extremely high depth of cut depending on insert size in 90 degree machining
< enormous stability due to robust inserts
< excellent roughing and finishing surface quality




**Shoulder milling cutter LN90**

| article | D | H | $d^{H7}$ | $z_{eff}$ | $a_p$ | ic | Kg | insert |
|---|---|---|---|---|---|---|---|---|
| 04L.0550.003 | 50 | 50 | 22 | 5 | 20,0 | yes | 0,52 | LN..2208..L |
| 04L.0650.005 | 63 | 50 | 22 | 6 | 20,0 | yes | 0,84 | LN..2208..L |
| 04L.0850.005 | 80 | 50 | 27 | 8 | 20,0 | yes | 1,33 | LN..2208..L |
| 04L.1050.005 | 100 | 50 | 32 | 10 | 20,0 | yes | 2,05 | LN..2208..L |
| 04L.1263.005 | 125 | 63 | 40 | 13 | 20,0 | yes | 3,54 | LN..2208..L |
| 04L.0540.030 | 50 | 40 | 22 | 6 | 10,0 | yes | 0,37 | LN..1208..L* |
| 04L.0640.030 | 63 | 40 | 22 | 7 | 10,0 | yes | 0,57 | LN..1208..L* |
| 04L.0850.030 | 80 | 50 | 27 | 10 | 10,0 | yes | 1,11 | LN..1208..L |
| 04L.1050.030 | 100 | 50 | 32 | 12 | 10,0 | yes | 1,82 | LN..1208..L |
| 04L.1263.030 | 125 | 63 | 40 | 15 | 10,0 | yes | 3,43 | LN..1208..L |
| 04L.1663.030 | 160 | 63 | 40 | 18 | 10,0 | yes | 4,55 | LN..1208..L |

* attention to different screw lengths



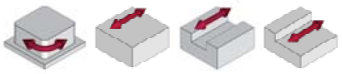

| insert | incircle diameter | | | insert thickness | | |
|---|---|---|---|---|---|---|
| | B | = | ø 12,50 | S = | | 8,00 |
| | L | = | ø 11,20 | | | |
| | L | = | ø 22,00 | | | |

## Allocation from machining parameters of AV material groups

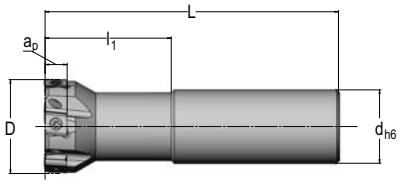
| | | | | | cast iron | | | steel | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | article | AS | grade | | D20 | D18 | D17 | A22 | A20 | A18 | A16 | B15 | B14 |
| LN..1208.. | LNHQ12081000201TL28S | 4 | SKY77 | $h_{max}$ | 0,22 | 0,2 | 0,18 | 0,22 | 0,2 | 0,18 | | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 230 | 220 | | | |
| | | | CAN²77 | $h_{max}$ | 0,25 | 0,2 | 0,18 | | | | | | |
| | | | | $v_c$ | 360 | 340 | 320 | | | | | | |
| LN..2208.. | LNHQ22080500301SL28 | 4 | SKY77 | $h_{max}$ | 0,22 | 0,2 | 0,18 | 0,22 | 0,2 | 0,18 | | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 230 | 220 | | | |
| | | | CAN²77 | $h_{max}$ | 0,25 | 0,2 | 0,18 | | | | | | |
| | | | | $v_c$ | 360 | 340 | 320 | | | | | | |

| insert | | |
|---|---|---|
| LN..1208..L | 08B.0416.7991 | TX215 |
| LN..1208..L* | 08B.0412.7991 | TX215 |
| LN..2208..L | 08B.0513.7991 | TX220 |

# Shank end mill CS90

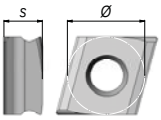


< highest break resistance because of tangential build in 4 cutting edge CN insert
< guaranteed 4 cutting edges in case of smaller CN insert
< high DOC and high feed rates at once
< fine pitch brings advantage for cast iron machining




**Shank end mill CS90**

| article | D | $l_1$ | $d_{h6}$ | L | $z_{eff}$ | $a_p$ | ic | Kg | insert |
|---|---|---|---|---|---|---|---|---|---|
| 11C.2509.001 | 25 | 31,5 | 25 | 90 | 4 | 7,0 | yes | 0,30 | CN..07T3.L |
| 11C.3210.001 | 32 | 43,0 | 25 | 100 | 5 | 7,0 | yes | 0,37 | CN..07T3.L |
| 11C.4011.001 | 40 | 48,5 | 32 | 110 | 6 | 7,0 | yes | 0,67 | CN..07T3.L |




| insert | incircle diameter | insert thickness |
|---|---|---|
| | ø 07 = 7,50 | S T3 = 4,00 |

## Allocation from machining parameters of AV material groups

| | article | AS | grade | | cast iron | | | steel | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | D20 | D18 | D17 | A22 | A20 | A18 | A16 | B15 | B14 |
| CN..07T3.. | CNHQ07T30600811SL28W | 4 | SKY77 | $h_{max}$ | 0,15 | 0,12 | 0,1 | 0,15 | 0,15 | 0,12 | 0,1 | | |
| | | | | $v_c$ | 240 | 230 | 220 | 240 | 240 | 230 | 220 | | |
| | | | NERO26 | $h_{max}$ | 0,15 | 0,12 | 0,1 | | | | | | |
| | | | | $v_c$ | 280 | 270 | 260 | | | | | | |
| | | | NERO$^2$77 | $h_{max}$ | 0,15 | 0,12 | 0,1 | 0,15 | 0,15 | 0,12 | 0,1 | | |
| | | | | $v_c$ | 240 | 220 | 200 | 240 | 220 | 200 | 180 | | |

| insert | | |
|---|---|---|
| CN..07T3.L | 08B.0309.7991 | TX208 |