

Ingersoll



T358

CUTTING TOOLS

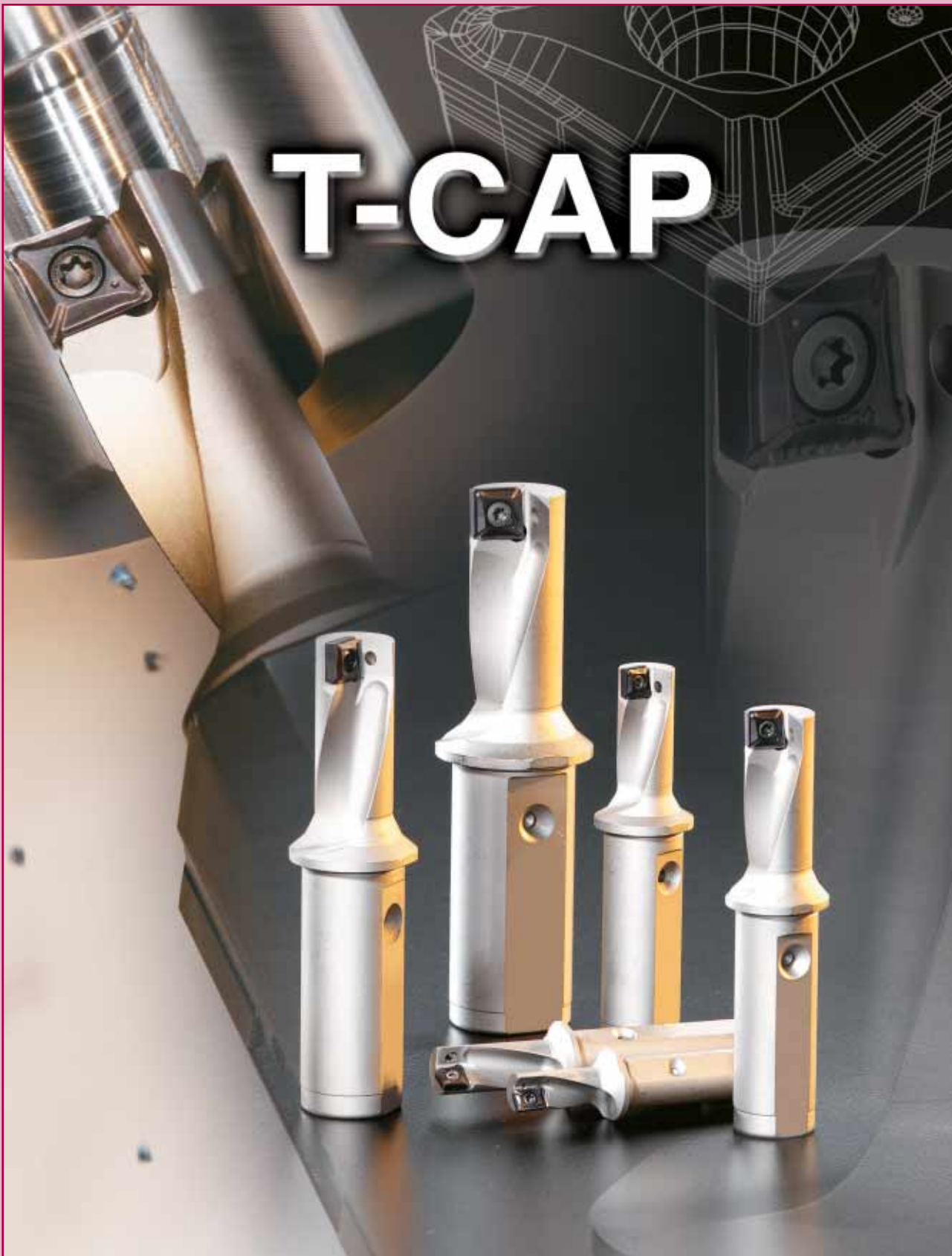
T-CAP

Cutting Tools



Member IMC Group
Ingersoll
Cutting Tools

T329



T-CAP

T362

TAEGUline

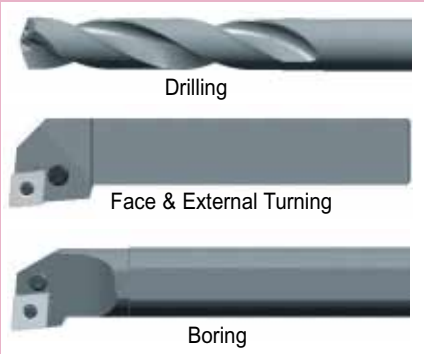
Features

Multi-function system

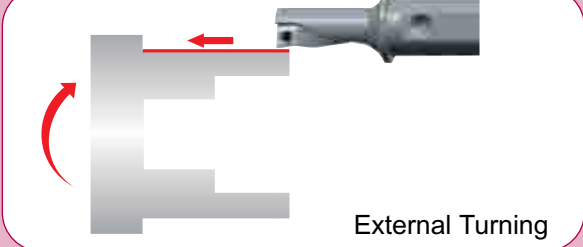
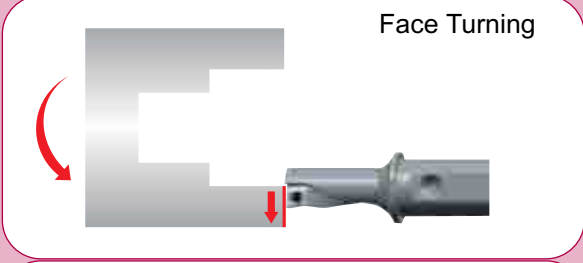
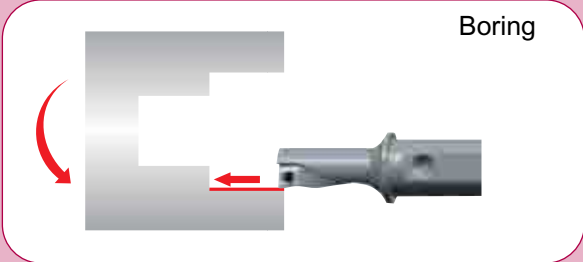
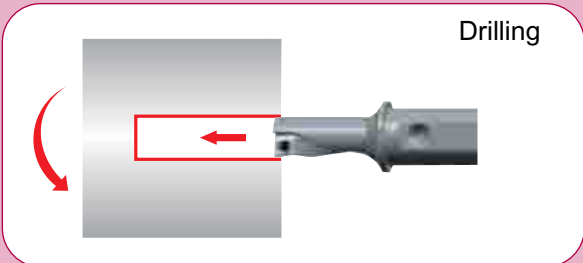
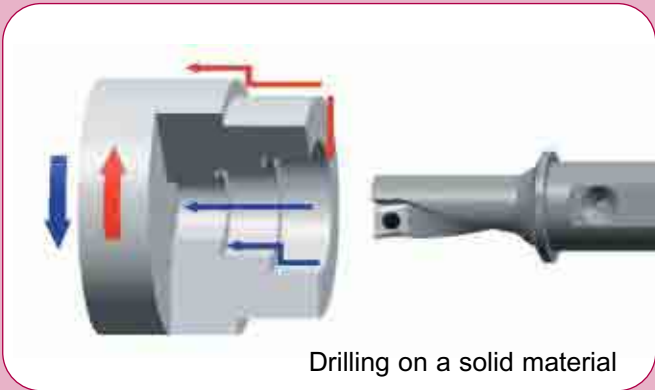
- Turning, boring and drilling with one tool
- Short set-up and cycle time
- Minimized tool positions and reduced tooling cost

Application

- Conventional



T-Cap



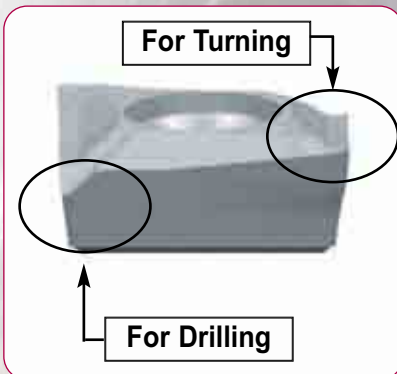
Features

■ Multi-function System



Body

- Internal coolant supply
- Cylindrical shank with one flat clamping surface
- Two face contact for strong clamping
- Helical flute for smooth chip flow
- Large chip gullet for good chip evacuation
- Secure clamping feature



Inserts

- Two different unique geometries for drilling and turning
- High helix cutting edge to minimize cutting forces
- Excellent chip control at low feed and small d.o.c.
- Optimum chip formation in drilling operations



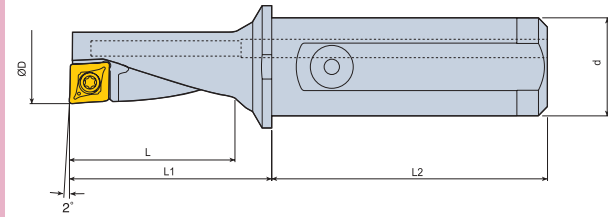
Clamping Units

- Center height of tool is adjustable on a lathe.
- Dovetail slide design provides strong secure clamping and rigidity.
- Micro adjustment scale: .0004"
- Y-axis adjustment range: +.008" to -.016"

TAEGLline

T-CAP HOLDERS

■ Holders



Metric Shanks

| Designation | Stock | | Dimension (mm) | | | | | Insert | Spare Parts | |
|-----------------------------|-------|---|----------------|------|------|------|----|-------------|--------------|---------|
| | R | L | ØD | Ød | L | L1 | L2 | | Screw | Wrench |
| TCAP 08R/L-2.25D | ● | ● | 8mm | 10mm | 18 | 22 | 38 | XCMT 0401□□ | SO 18034I/HG | T 6 |
| TCAP 10R/L-2.25D | ● | ● | 10mm | 12mm | 22.5 | 27.5 | 42 | XCMT 0502□□ | TS 20038I | T 6 |
| TCAP 12R/L-2.25D | ● | ● | 12mm | 16mm | 27 | 33 | 45 | XCMT 0602□□ | TS 22052I | T 7 |
| TCAP 14R/L-2.25D | ● | ● | 14mm | 16mm | 31.5 | 38.5 | 45 | XCMT 0703□□ | SM-25-064-00 | T 8 |
| TCAP 16R/L-2.25D | ● | ● | 16mm | 20mm | 36 | 44 | 50 | XCMT 0803□□ | SO 30100I | TD 9 |
| TCAP 20R/L-2.25D | ● | ● | 20mm | 25mm | 45 | 55 | 56 | XCMT 10T3□□ | SM-35-088-60 | DS-T10T |
| NEW TCAP 25R/L-2.25D | ● | ● | 25mm | 32mm | 56.5 | 69 | 65 | XCMT1304□□ | TS45A100I/HG | TD 20 |
| NEW TCAP 32R/L-2.25D | ● | ● | 32mm | 40mm | 72 | 86 | 74 | XCMT1705□□ | TS45A100I/HG | TD 20 |

Inch Shanks

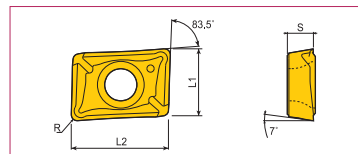
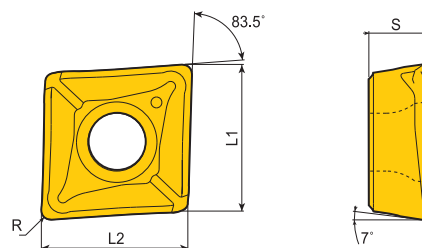
| Designation | Stock | | Dimension (inch) | | | | | Insert | Spare Parts | |
|--------------------------------|-------|---|------------------|-------|-------|-------|------|-------------|--------------|---------|
| | R | L | ØD | Ød | L | L1 | L2 | | Screw | Wrench |
| TCAP 08R/L-2.25D-IN | ● | ● | .315 | .375 | .708 | .866 | 1.50 | XCMT 0401□□ | SO 18034I/HG | T 6 |
| TCAP 10R/L-2.25D-IN | ● | ● | .394 | .500 | .886 | 1.083 | 1.65 | XCMT 0502□□ | TS 20038I | T 6 |
| TCAP 12R/L-2.25D-IN | ● | ● | .472 | .625 | 1.063 | 1.300 | 1.77 | XCMT 0602□□ | TS 22052I/HG | T 7 |
| TCAP 14R/L-2.25D-IN | ● | ● | .551 | .625 | 1.240 | 1.516 | 1.77 | XCMT 0703□□ | SM25-064-00 | T 8 |
| TCAP 16R/L-2.25D-IN | ● | ● | .630 | .750 | 1.417 | 1.732 | 1.97 | XCMT 0803□□ | SO 30100I | TD 9 |
| TCAP 20R/L-2.25D-IN | ● | ● | .787 | 1.000 | 1.772 | 2.165 | 2.20 | XCMT 10T3□□ | SM35-088-60 | DS-T10T |
| NEW TCAP 25R/L-2.25D-IN | ● | ● | .984 | 1.25 | 2.214 | 2.717 | 2.56 | XCMT1304□□ | TS45A100I/HG | TD 20 |
| NEW TCAP 32R/L-2.25D-IN | ● | ● | 1.260 | 1.50 | 2.835 | 3.386 | 2.91 | XCMT1705□□ | TS45A100I/HG | TD 20 |

■ T-CAP INSERTS

■ Inserts



Right Hand Shown (XCMT 0401)



| Designation | Stock | | | Dimension (inch) | | | |
|---------------------------|--------|---------|---------|------------------|------|------|------|
| | TT6030 | TT 9030 | TT 8020 | L1 | L2 | S | R |
| XCMT 040104R TC | | ● | ● | .173 | .252 | .067 | .016 |
| XCMT 040104L TC | | ● | ● | .173 | .252 | .067 | .016 |
| XCMT 050204 TC | | ● | ● | .220 | .220 | .083 | .016 |
| XCMT 060204 TC | | ● | ● | .252 | .252 | .094 | .016 |
| XCMT 070304 TC | | ● | ● | .295 | .295 | .125 | .016 |
| XCMT 080304 TC | ● | ● | ● | .331 | .331 | .125 | .016 |
| XCMT 10T304 TC | ● | ● | ● | .413 | .413 | .156 | .016 |
| NEW XCMT 10T308 TC | | ● | ● | .413 | .413 | .156 | .031 |
| NEW XCMT 130404 TC | | ● | | .528 | .528 | .187 | .016 |
| NEW XCMT 130408 TC | | ● | | .528 | .528 | .187 | .031 |
| NEW XCMT 170508 TC | | ● | | .685 | .685 | .219 | .031 |

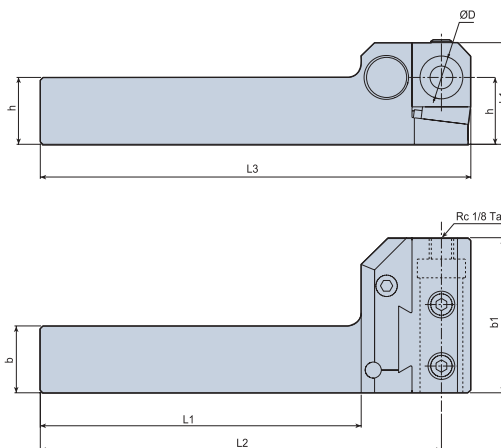
TT9030 - General purpose applications

TT8020 - Stainless steel applications.

TT6030 - Cast iron applications. Not recommended for drilling.

T-CAP ACCESSORIES

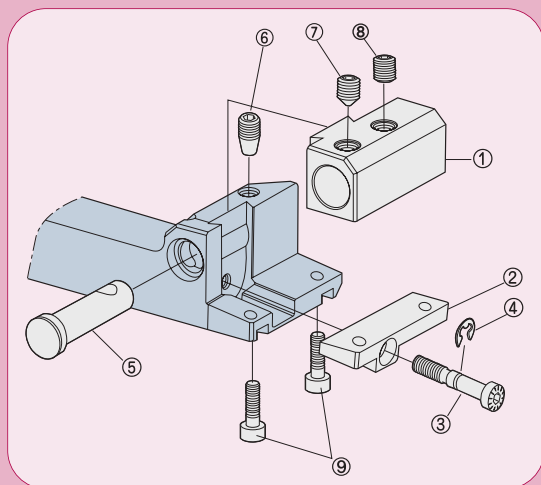
Clamping Units (Center Alignment System)



| Designation | Stock | Dimension (mm) | | | | | | | | Tool Holders |
|--------------------------|-------|----------------|------|------|------|------|------|------|------|----------------------------------|
| | | h | b | ØD | h1 | b1 | L1 | L2 | L3 | |
| TGHR 19.05-D15.88 | ● | .750 | .750 | .625 | 1.50 | 2.28 | 4.72 | 5.91 | 6.34 | TCAP 08R/L-IN* TCAP 10R/L-IN* |
| TGHR 25.4-D15.88 | ● | 1.00 | 1.00 | .625 | 1.50 | 2.28 | 4.72 | 5.91 | 6.34 | TCAP 12R/L-IN TCAP 14R/L-IN |
| TGHR 25.4-D25.4 | ● | 1.00 | 1.00 | 1.00 | 2.20 | 2.95 | 4.72 | 6.18 | 6.85 | TCAP 16R/L-IN* TCAP 20R/L-IN |

*Requires sleeve.

| Designation | Spare Parts | | | | | | | | | |
|--------------------------|----------------|------------|-----------|---------------|----------------|--------------------|---------------------------|------------------------|----------------|----------------|
| | Block | Wedge | Snap Ring | Wedge Screw | Mounting Pin | Mounting Pin Screw | Mounting Screw | | Lock Screw | Wrench |
| TGHR 19.05-D15.88 | | | | | | | | | | |
| | TGHR-D15.88-BL | TGHR-WD | WSR 4 | TGH-WS | TGH-MPI | TGH-MPS | SS X M8 X1.25 X10-C | SS X M8 X1.25 X8 | - | L-W 4 |
| TGHR 25.4-D15.88 | | | | | | | | | | |
| | TGHR-D25.4-BL | TGHR-WD-25 | WSR 4 | TGH-WS -25 | TGH-MPI -25 | TGH-MPS -25 | SS M10X 1.5X12-C | SS M10X 1.5X10 | SH M6X 1X20 | L-W 4 L-W 5 |

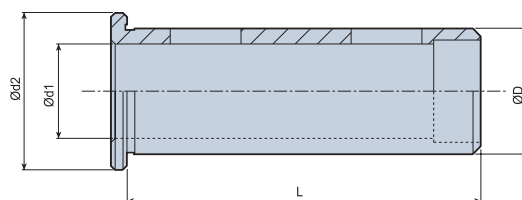


| Number | Spare Parts |
|--------|--------------------|
| 1 | Block |
| 2 | Wedge |
| 3 | Wedge Screw |
| 4 | Snap Ring |
| 5 | Mounting Pin |
| 6 | Mounting Pin Screw |
| 7 | Mounting Screw |
| 8 | |
| 9 | Lock Screw |

- Center height adjustment is possible on the lathe.
- Dovetail slide design provides strong secure clamping and rigidity.
- Micro adjustment scale: .0004"
- Y-axis adjustment range: +.008" to -.016"

■ T-CAP ACCESSORIES

■ Sleeves for Clamping Units



Metric to Metric

| Designation | Stock | Dimension | | | Tool Holders (for use with metric shank) |
|------------------|-------|-----------|------|------|--|
| | | ØD | Ød1 | L | |
| TSL 16-10 | ● | 16mm | 10mm | 47mm | TCAP 08R/L |
| TSL 16-12 | ● | 16mm | 12mm | 47mm | TCAP 10R/L |
| TSL 25-20 | ● | 25mm | 20mm | 55mm | TCAP 16R/L |

Inch to Metric

| | | | | | |
|--------------------|---|--------|-------|--------|--------------------------|
| TSL19.05-10 | ● | .750" | 10 mm | 2.00" | TCAP 08R/L |
| TSL19.05-12 | ● | .750" | 12 mm | 2.00" | TCAP 10R/L |
| TSL25.4-10 | ● | 1.000" | 10 mm | 2.75" | TCAP 08R/L |
| TSL25.4-12 | ● | 1.000" | 12 mm | 2.75" | TCAP 10R/L |
| TSL25.4-16 | ● | 1.000" | 16 mm | 2.75" | TCAP 12R/L or TCAP 14R/L |
| TSL25.4-20 | ● | 1.000" | 20 mm | 2.75" | TCAP 16R/L |
| TSL31.75-10 | ● | 1.250" | 10 mm | 3.25" | TCAP 08R/L |
| TSL31.75-12 | ● | 1.250" | 12 mm | 3.25" | TCAP 10R/L |
| TSL31.75-16 | ● | 1.250" | 16 mm | 3.25" | TCAP 12R/L or TCAP 14R/L |
| TSL31.75-20 | ● | 1.250" | 20 mm | 3.25" | TCAP 16R/L |
| TSL31.75-25 | ● | 1.250" | 25 mm | 3.25" | TCAP 20R/L |
| TSL38.1-10 | ● | 1.500" | 10 mm | 3.375" | TCAP 08R/L |
| TSL38.1-12 | ● | 1.500" | 12 mm | 3.375" | TCAP 10R/L |
| TSL38.1-16 | ● | 1.500" | 16 mm | 3.375" | TCAP 12R/L or TCAP 14R/L |
| TSL38.1-20 | ● | 1.500" | 20 mm | 3.375" | TCAP 16R/L |
| TSL38.1-25 | ● | 1.500" | 25 mm | 3.375" | TCAP 20R/L |
| TSL50.8-25 | ● | 2.000" | 25mm | 4.315" | TCAP 20R/L |

■ T-CAP ACCESSORIES

■ Sleeves for Clamping Units

Inch to Inch

| Designation | Stock | Dimension | | | Tool Holders (for use with metric shank) |
|----------------|-------|-----------|-------|-------|---|
| | | ØD | Ød1 | L | |
| TSL25.4-9.52 | • | 1.000 | 0.375 | 2.75 | TCAP 08R/L-IN |
| TSL25.4-12.7 | • | 1.000 | 0.500 | 2.75 | TCAP 10R/L-IN |
| TSL25.4-15.88 | • | 1.000 | 0.625 | 2.75 | TCAP 12R/L-IN or TCAP14R/L-IN |
| TSL25.4-19.05 | • | 1.000 | 0.750 | 2.75 | TCAP 16R/L-IN |
| TSL31.75-9.52 | • | 1.250 | 0.375 | 3.25 | TCAP 08R/L-IN |
| TSL31.75-12.7 | • | 1.250 | 0.500 | 3.25 | TCAP 10R/L-IN |
| TSL31.75-15.88 | • | 1.250 | 0.625 | 3.25 | TTCAP 12R/L-IN or TCAP14R/L-IN |
| TSL31.75-19.05 | • | 1.250 | 0.750 | 3.25 | TCAP 16R/L-IN |
| TSL31.75-25.4 | • | 1.250 | 1.000 | 3.25 | TCAP 20R/L-IN |
| TSL38.1-9.52 | • | 1.500 | 0.375 | 3.375 | TCAP 08R/L-IN |
| TSL38.1-12.7 | • | 1.500 | 0.500 | 3.375 | TCAP 10R/L-IN |
| TSL38.1-15.88 | • | 1.500 | 0.625 | 3.375 | TCAP 12R/L-IN or TCAP14R/L-IN |
| TSL38.1-19.05 | • | 1.500 | 0.750 | 3.375 | TCAP 16R/L-IN |
| TSL38.1-25.4 | • | 1.500 | 1.000 | 3.375 | TCAP 20R/L-IN |
| TSL38.1-31.75 | • | 1.500 | 1.250 | 3.375 | TCAP 25R/L-IN |
| TSL44.45-12.7 | | 1.750 | 0.500 | 3.50 | TCAP 10R/L-IN |
| TSL44.45-15.88 | | 1.750 | 0.625 | 3.50 | TCAP 12R/L-IN or TCAP14R/L-IN |
| TSL44.45-19.05 | | 1.750 | 0.750 | 3.50 | TCAP 16R/L-IN |
| TSL44.45-25.4 | | 1.750 | 1.000 | 3.50 | TCAP 20R/L-IN |
| TSL44.45-31.75 | | 1.750 | 1.250 | 3.50 | TCAP 25R/L-IN |
| TSL50.8-12.7 | | 2.000 | 0.500 | 3.625 | TCAP 10R/L-IN |
| TSL50.8-15.88 | | 2.000 | 0.625 | 3.625 | TCAP 12R/L-IN or TCAP14R/L-IN |
| TSL50.8-19.05 | | 2.000 | 0.750 | 3.625 | TCAP 16R/L-IN |
| TSL50.8-25.4 | | 2.000 | 1.000 | 3.625 | TCAP 20R/L-IN |
| TSL50.8-31.75 | | 2.000 | 1.250 | 3.625 | TCAP 25R/L-IN |
| TSL50.8-38.1 | | 2.000 | 1.500 | 3.625 | TCAP 32R/L-IN |

■ T-Cap multifunctional tools in a convenient kit (right-hand tools only)

Each kit contains:

- T-CAP holder (1)
- XCMT inserts (10)
- Insert screws (5)
- Driver (1)



Metric

| EDP # | Kit Item Number | Description |
|---------|-------------------------|-----------------------------|
| 3104037 | KITTCAP08R-2.25D TT9030 | 8 mm diameter, 10 mm shank |
| 3104038 | KITTCAP10R-2.25D TT9030 | 10 mm diameter, 12 mm shank |
| 3104039 | KITTCAP12R-2.25D TT9030 | 12 mm diameter, 16 mm shank |
| 3104040 | KITTCAP14R-2.25D TT9030 | 14 mm diameter, 16 mm shank |
| 3104041 | KITTCAP16R-2.25D TT9030 | 16 mm diameter, 20 mm shank |
| 3104042 | KITTCAP20R-2.25D TT9030 | 20 mm diameter, 25 mm shank |

Inch

| EDP # | Kit Item Number | Description |
|---------|---------------------------|-----------------------------|
| 3104043 | KITTCAP08R-2.25DIN TT9030 | 8 mm diameter, .375" shank |
| 3104044 | KITTCAP10R-2.25DIN TT9030 | 10 mm diameter, .500" shank |
| 3104064 | KITTCAP12R-2.25DIN TT9030 | 12 mm diameter, .625" shank |
| 3104065 | KITTCAP14R-2.25DIN TT9030 | 14 mm diameter, .625" shank |
| 3104066 | KITTCAP16R-2.25DIN TT9030 | 16 mm diameter, .750" shank |
| 3104067 | KITTCAP20R-2.25DIN TT9030 | 20 mm diameter, 1.00" shank |



■ USER GUIDE

■ Comparison Test Results

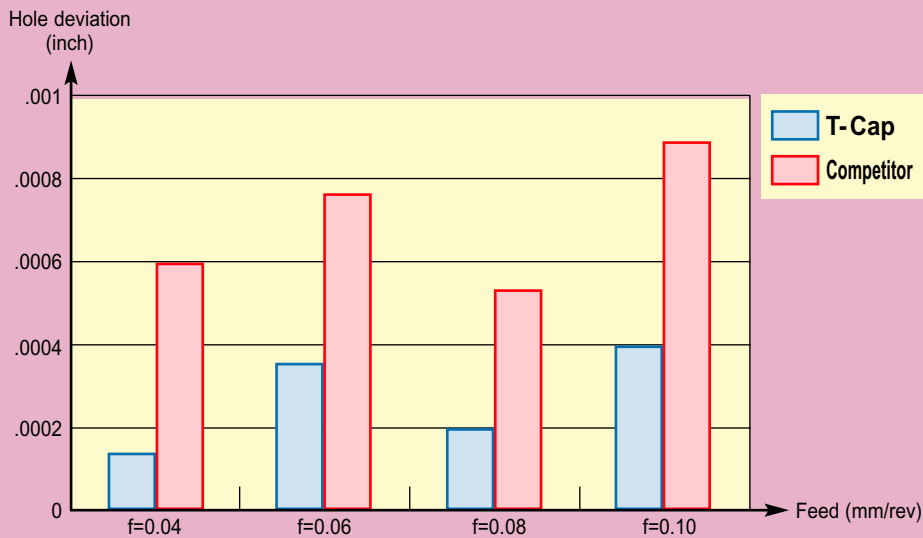
■ Chip shape in Drilling

- Material=SAE 4140 (220BHN)
- Diameter of tool = .472"
- V = 393 sfm •Drilling depth = .984" •Blind hole •Wet cutting

| Maker | F=0.05mm/rev | F=0.10mm/rev | |
|------------|--------------|--------------|-----------------------------------|
| T-Cap | | | Optimal chips |
| Competitor | | | Chips that occur during vibration |

■ Hole deviation in Drilling

- Material = SAE 4140 (220BHN) •Diameter of tool = .394"
- V = 393 sfm •Drilling depth = .787" •Blind hole •Wet cutting



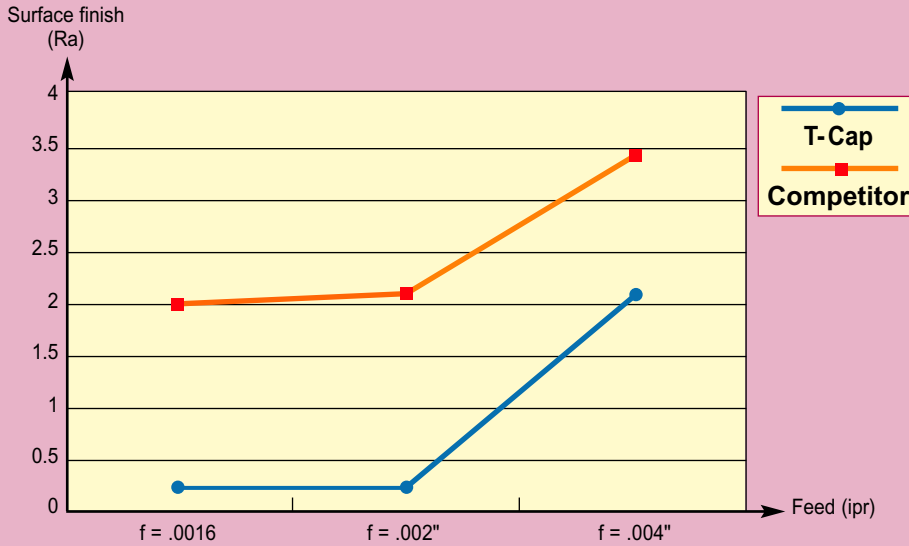
T-Cap shows less deviation in each feed rate.



T370

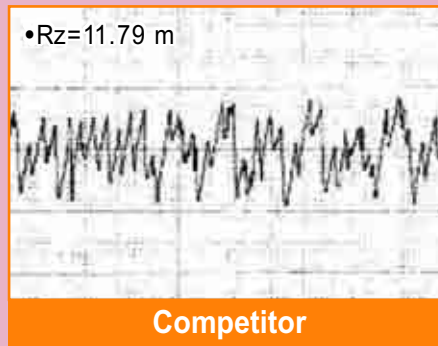
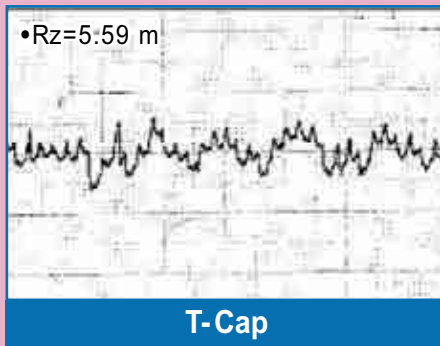
Surface Finish in Drilling

- Material = SAE 4140 (220BHN) •Diameter of tool = .394",
- V = 393 sfm •Drilling depth = .008" •Blind hole •Wet cutting



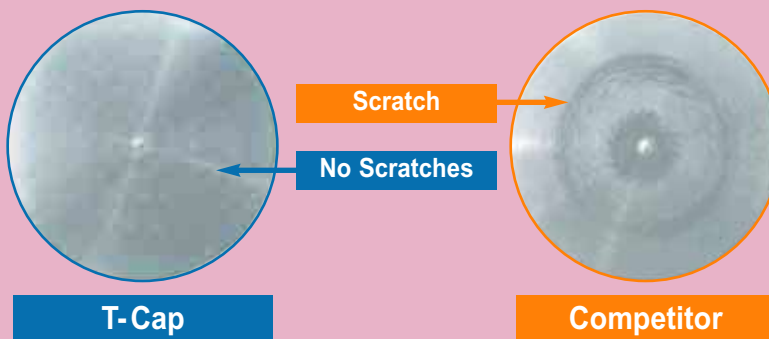
Surface Finish in External Turning

- Material=SAE 1045 (220BHN)
- V = 490 sfm •f = .004 ipr •Ap = .020" •Wet cutting



Interference Between Insert and Workpiece in Face Turning

- Material = SAE 1045 (220BHN)
- V = 490 sfm •f = .004 ipr •Ap = .020" •Dry cutting





■ USER GUIDE

■ Tool Life Comparison

■ Drilling & Chamfering on Tool Steel

- Holder: TCAP 14R-2.25D
- Insert: XCMT 070304 TC TT9030

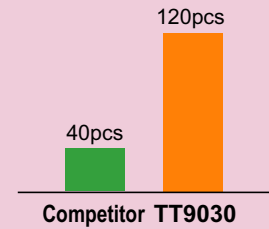
Part

- Tool body, SAE4340 (34HRC)

Cutting parameters

- Drilling: 1200rpm (D = .551")
f = .002 ipr
d.o.c = .906"
Wet cutting
- Boring & Chamfering: V = 590 sfm
f = .008"
Ap = .020
Wet cutting

Tool life (pcs/edge)



■ Turning on Steel

- Holder: TCAP 12R-2.25D
- Insert: XCMT 060204 TC TT9030

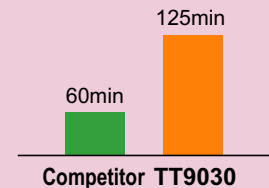
Material

- SAE 4140 (220BHN)

Cutting parameters

- V = .590 sfm
- f = .004 ipr
- Ap = .028"
- Wet cutting

Tool life (min)



■ Turning on Stainless Steel

- Holder: TCAP 12R-2.25D
- Insert: XCMT 060204 TC TT8020

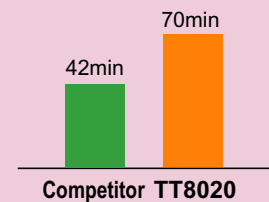
Material

- 316 stainless steel (200BHN)

Cutting parameters

- V = 426 sfm
- f = .004 ipr
- Ap = .028"
- Wet cutting

Tool life (min)



■ Turning on Gray Cast Iron

- Holder: TCAP 12R-2.25D
- Insert: XCMT 060204 TC TT9030

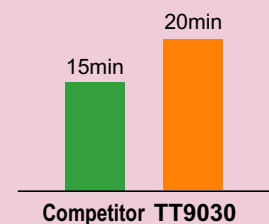
Material

- GG25 (200BHN)

Cutting parameters

- V= 590 sfm
- f= .004 ipr
- Ap=.028"
- Wet cutting

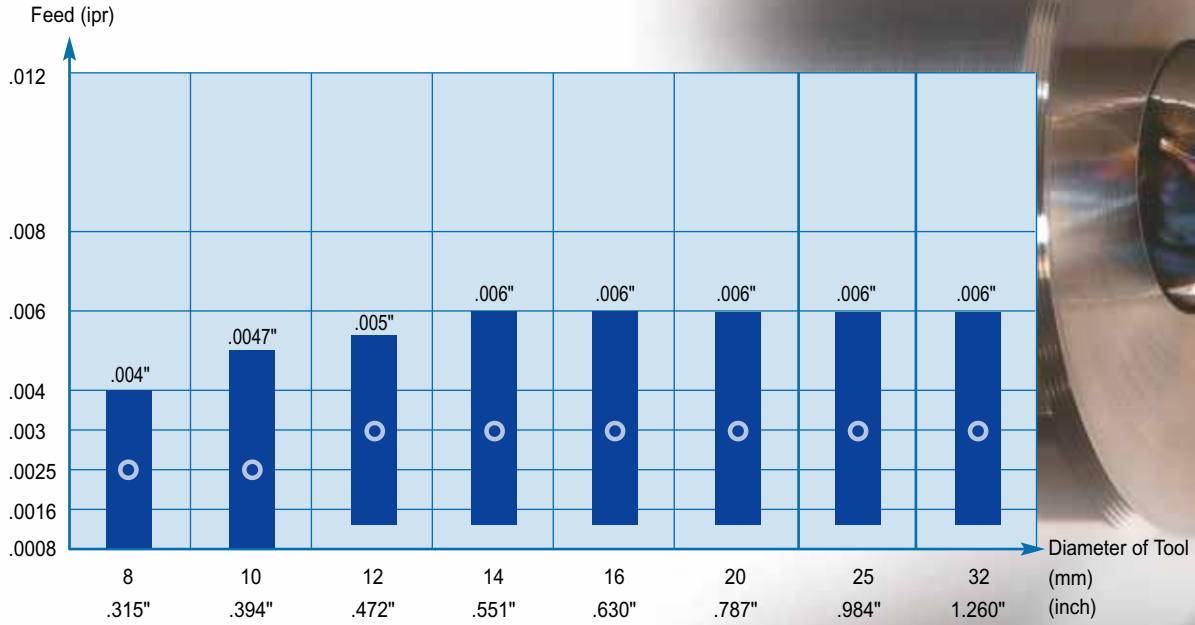
Tool life (min)



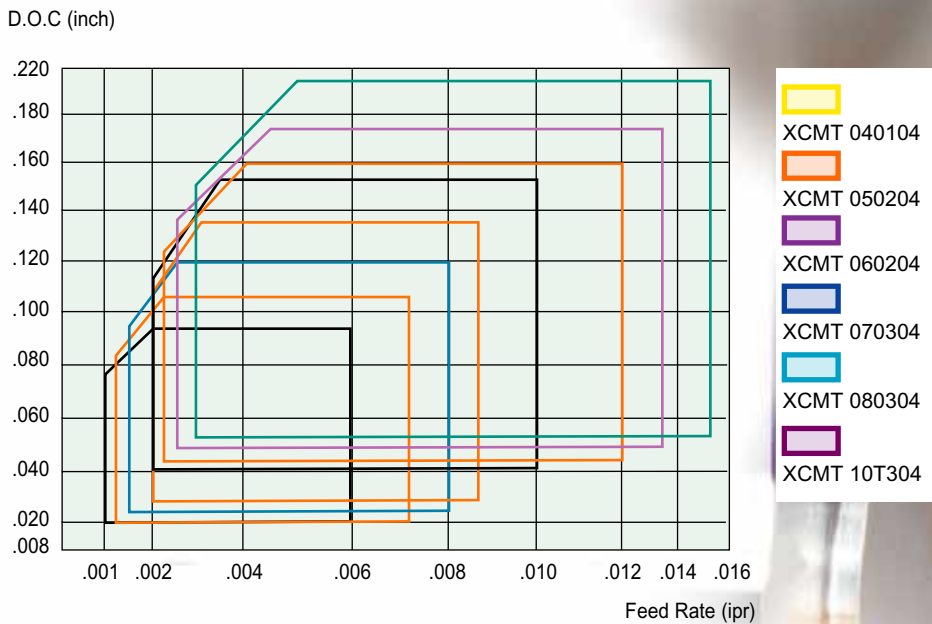
T372

■ Chip Control Range

■ Drilling (Material: SAE 4140 (220BHN), V=393 sfm)



■ Turning (Material: SAE 1045 (220BHN), V=490 sfm)

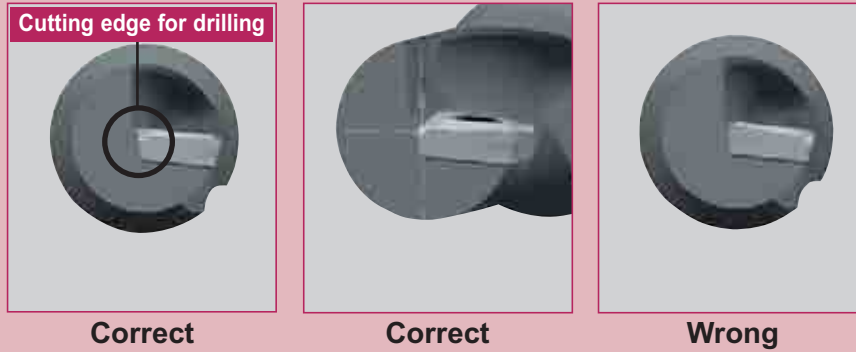


■ USER GUIDE

■ Set-Up

■ Insert positioning

•Cutting edge for drilling should be positioned in the center of tool body.



■ Coolant pressure

•Must be above 30 psi in 2.25xD drills, regardless of drilling diameter. (Optimal pressure is above 70 psi)

■ Optimization of chip shape

•Material with low carbon content (Low Carbon Steel/Low Carbon Alloy Steel)

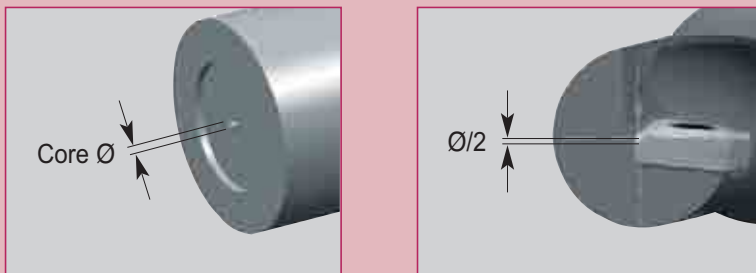
High speed machining is recommended to make the chips thinner as many problems are caused by thick chips.

•Material with medium to high carbon content (Carbon Steel/Alloy Steel)

If too tight (thick chip)? Increase speed if the speed is slow or reduce feed.

If too loose (long chip)? Reduce speed if the speed is high or increase feed.

■ Set-Up



Please check formation of core and its size after drilling .125" to .250" depth and diameter.
Core should be within .006"-.018".

If you are using a clamping unit, adjustment is easy and accurately performed by adjusting the Y-axis of the clamping unit.

If the TCAP is being held in a fixed turret location, reverse the tool by 180° and test again to see if core size is within acceptable tolerances.

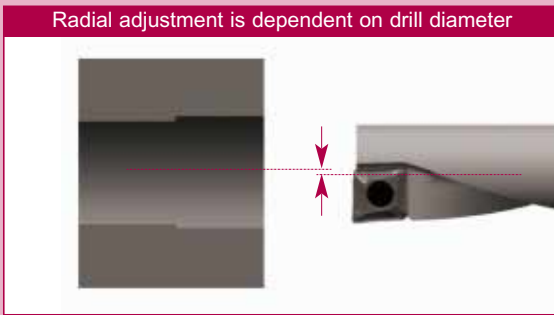
If a core does not appear,

•It can cause breakage of insert and vibration when drilling or turning.

If the size of core is over the recommendation,

•It will cause overload and vibration.

■ Radial adjustment (Off-center drilling)



(inch)

| Holder | Drill Dia. | Dmin | Dmax |
|------------------|------------|-------|-------|
| TCAP 08 - | 0.315 | 0.309 | 0.329 |
| TCAP 10 - | 0.394 | 0.387 | 0.417 |
| TCAP 12 - | 0.472 | 0.465 | 0.496 |
| TCAP 14 - | 0.551 | 0.543 | 0.575 |
| TCAP 16 - | 0.630 | 0.620 | 0.650 |
| TCAP 20 - | 0.787 | 0.780 | 0.811 |
| TCAP 25 - | 0.984 | 0.915 | 1.016 |
| TCAP 32 - | 1.260 | 1.252 | 1.300 |

■ Recommended Cutting Conditions

■ Cutting speed (Vc)

| Workpiece Materials | Hardness (BHN) | Cutting speed: Vc (sfm) | |
|------------------------------------|----------------|-------------------------|---------------------|
| | | In Drilling | In Turning & Boring |
| Low Carbon Steel (-0.25% C) | - 150 | 425 - 790 | 490 - 895 |
| Carbon Steel (0.25% < C) | 150 - 250 | 295 - 525 | 330 - 590 |
| Low Alloy Steel | - 180 | 395 - 690 | 460 - 755 |
| Medium Alloy Steel | 200 - 250 | 230 - 460 | 260 - 525 |
| High Alloy Steel | 250 - 350 | 165 - 330 | 200 - 395 |
| Martensitic Stainless Steel | 200 | 360 - 590 | 425 - 655 |
| Austenitic Stainless Steel | 200 | 295 - 525 | 330 - 590 |
| Gray Cast Iron | 180 - 220 | 360 - 590 | 395 - 655 |
| Ductile Cast Iron | 200 - 240 | 295 - 525 | 330 - 590 |
| Aluminum Alloy | 60 - 130 | 330 - 1640 | 490 - 1970 |
| Copper Alloy | 90 - 100 | 330 - 1310 | 330 - 1640 |

■ Feed (f)

| Designation | Application | Cutting Conditions | |
|--------------------|------------------|-----------------------|-----------------------|
| | | ap (inch) | f (ipr) |
| XCMT 040104 | External Turning | .023" (.008" - .070") | .002" (.001" - .006") |
| | Drilling | - | .002" (.001" - .004") |
| XCMT 050204 | External Turning | .031" (.008" - .087") | .003" (.001" - .007") |
| | Drilling | - | .002" (.001" - .005") |
| XCMT 060204 | External Turning | .039" (.012" - .098") | .003" (.001" - .008") |
| | Drilling | - | .003" (.001" - .005") |
| XCMT 070304 | External Turning | .047" (.016" - .110") | .005" (.002" - .009") |
| | Drilling | - | .003" (.001" - .006") |
| XCMT 080304 | External Turning | .059" (.016" - .126") | .005" (.002" - .010") |
| | Drilling | - | .003" (.001" - .006") |
| XCMT 10T304 | External Turning | .071" (.020" - .138") | .005" (.002" - .012") |
| | Drilling | - | .003" (.001" - .006") |
| XCMT 10T308 | External Turning | .071" (.020" - .135") | .008" (.004" - .016") |
| | Drilling | - | .003" (.001" - .006") |
| XCMT 130404 | External Turning | .080" (.024" - .170") | .006" (.003" - .013") |
| | Drilling | - | .003" (.001" - .006") |
| XCMT 130408 | External Turning | .080" (.024" - .170") | .008" (.004" - .016") |
| | Drilling | - | .003" (.001" - .006") |
| XCMT 170508 | External Turning | .118" (.028" - .209") | .009" (.004" - .016") |
| | Drilling | - | .003" (.004" - .006") |