

TD4N 4 Corner Super Radius

Modular Type D16-42
Shank Type D16-40

**Double Face High Feed Insert
Reduce Stock Material**

- Fits to Mild Steel ~ Hardened Steel up to 55 HRC | Cast iron | Stainless
- Available Grades:

GX2140 **JM4160** **JS4045** **JP4120**



B Type
Lower Cutting Force

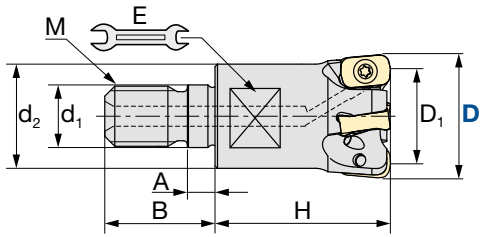
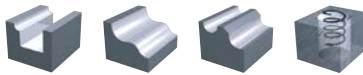


C Type
For General Application



TD4N | 4 Corner Super Radius | Modular Type

| | | | | |
|--------------------------------|----------------------|-----------------------------|------------------|----------------------------|
| Q max High Efficient | ▽ Roughing | ▽▽ Semi Finishing | HRC 55 | No. of Teeth 2-6 |
|--------------------------------|----------------------|-----------------------------|------------------|----------------------------|



| Diameter Holder only | CAM Radius | Fastening Torque |
|-----------------------|---------------|------------------|
| -0.06/-0.11 mm | 2.0 mm | 1.1 Nm |

| | | | Size [mm] | | | | | | | | | |
|---------|--------------|---|-----------|----------------|----|-----|----|----------------|----------------|-----|----|------------------------------|
| ID Code | Item Code | Z | D | D ₁ | H | A | B | d ₁ | d ₂ | M | E | Inserts |
| FH603 | TD4N-2016M-2 | 2 | 16 | 10 | 25 | 5.5 | 17 | 8.5 | 12.8 | M8 | 10 | ENMU0603ER-B ENMU0603ER-C |
| FH604 | TD4N-2020M-3 | 3 | 20 | 14 | 30 | | 19 | 10.5 | 17.8 | M10 | 15 | |
| FH605 | TD4N-2025M-4 | 4 | 25 | 19 | 35 | | 22 | 12.5 | 20.8 | M12 | 17 | |
| FH606 | TD4N-2032M-5 | 5 | 32 | 26 | 40 | 6.0 | 23 | 17.0 | 28.8 | M16 | 22 | |
| FH607 | TD4N-2035M-5 | | 35 | 29 | | | | | | | | |
| FH608 | TD4N-2040M-6 | 6 | 40 | 34 | | | | | | | | |
| FH609 | TD4N-2042M-6 | | 42 | 36 | | | | | | | | |

TD4N | 4 Corner Super Radius | Shank Type

| | | | | |
|--------------------------------|----------------------|-----------------------------|------------------|----------------------------|
| Q max High Efficient | ▽ Roughing | ▽▽ Semi Finishing | HRC 55 | No. of Teeth 2-6 |
|--------------------------------|----------------------|-----------------------------|------------------|----------------------------|

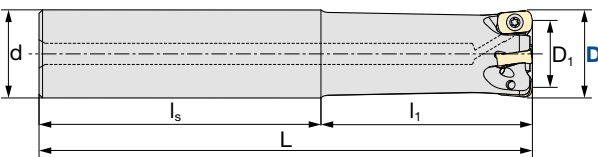
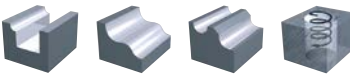


Fig. 1: Standard Type

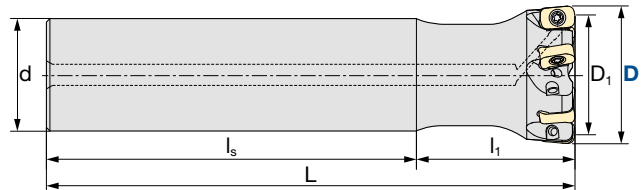


Fig. 2: Undercut Type

| Diameter Holder only | CAM Radius | Fastening Torque |
|-----------------------|---------------|------------------|
| -0.06/-0.11 mm | 2.0 mm | 1.1 Nm |

| | | | Size [mm] | | | | | | | | |
|---------|----------------|---|-----------|----------------|-----|----------------|----------------|-------|-------|------------------------------|--|
| ID Code | Item Code | Z | D | D ₁ | L | l ₁ | l _s | d | Shape | Inserts | |
| FH610 | TD4N-2016S-2 | 2 | 16 | 10 | 100 | 30 | 70 | 16 | Fig.1 | ENMU0603ER-B ENMU0603ER-C | |
| FH615 | TD4N-2016L-2 | | | | 150 | 50 | 100 | | | | |
| FH611 | TD4N-2020S-3 | 3 | 20 | 14 | 130 | 80 | 20 | | | | |
| FH616 | TD4N-2020L-3 | | | | 160 | | | 80 | | | |
| FH612 | TD4N-2025S-4 | 4 | 25 | 19 | 140 | | 60 | 25 | | | |
| FH617 | TD4N-2025L-4 | | | | 180 | | 100 | | | | |
| FH613 | TD4N-2032S-5 | 5 | 32 | 26 | 150 | 70 | 32 | Fig.2 | | | |
| FH618 | TD4N-2032L-5 | | | | 200 | 120 | | | | | |
| FH614 | TD4N-2040S32-6 | 6 | 40 | 34 | 150 | 45 | | | 105 | | |
| FH619 | TD4N-2040L32-6 | | | | 220 | | 175 | | | | |

※ S = Short · L = Long

NOTE: Specifications for the products listed in this catalog are subject to change without notice due to replacement or modification.

INSERTS | TD4N

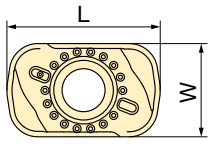


Fig. 1: ENMU0603ER-B
Low cutting force geometry
For SUS and sticky materials

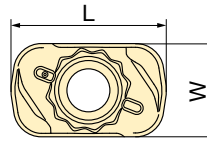


Fig. 2: ENMU0603ER-C
Reinforced edge geometry
For general use
For hard material, interrupt milling

| Inserts | Size (mm) | | | | Grade | | | | Tolerance Class | Type |
|--------------|-----------|---|-----|-------|--------|--------|--------|--------|-----------------|--------|
| | L | W | T | CAM R | GX2140 | JM4160 | JS4045 | JP4120 | | |
| ENMU0603ER-B | 10 | 6 | 4.2 | 2.0 | WF785 | WF784 | WF783 | WF782 | M | Fig. 1 |
| ENMU0603ER-C | | | | | WF781 | WF780 | WF779 | WF778 | | Fig. 2 |

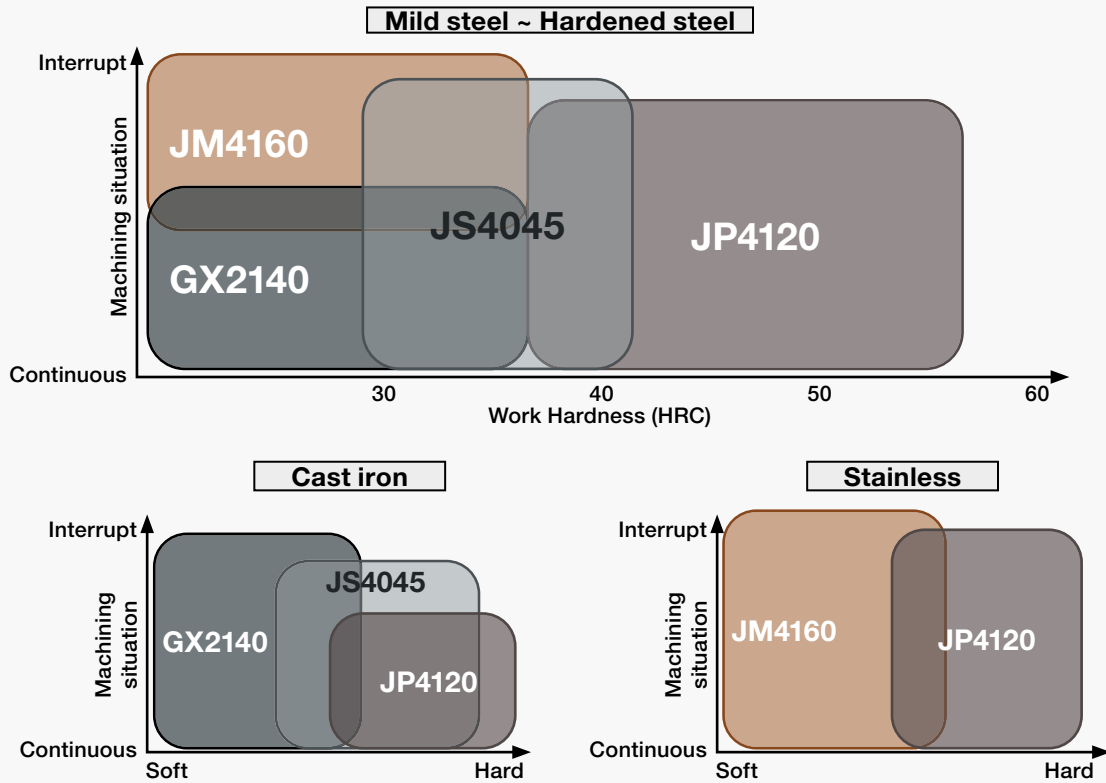




B Type
For lower cutting force.
Recommended for sticky material like Stainless Steel



C Type
For general usage.
Same strength as high feed item.
Against chip biting, vibration, crater wear

TD4N | Insert grade – target material



| Parts | Clamp Screw | | | | Wrench / Torque Blade | | |
|-------------|---|-------------------|----------------------|------------------|---|---------|-------------------|
| | ID Code | Item Code | Type | Fastening Torque | Description | ID Code | Item Code |
| Cutter Body | ET175 | 250-141(A) | Standard Screw (T8) | 1.1 Nm | T8 Wrench | ET013 | 104-T8 |
| | ET177 | 250-141/B | Low Head Screw (7IP) | | 7IP Torque Blade for Torque-Fix (NT163) | NT237 | 7IP-Torque |
| Shape |  | | | |  | | |

NOTE:

In some situations, chips could flow across screw during machining. In this case please use screw **250-141/B** with lower head to avoid wear of screw. To tighten “Low Head Screw” please use a **7IP wrench** or blade. **7IP blade** (NT237) can be used with torque screwdriver from “Torque-Fix (NT163).”

TD4N | Recommended Cutting Conditions

Please use the correct ramping angles, shown in the table on Page 5.

| Work piece material | Recommend grade & Target hardness (HRC) | | | Emulsion | Mist | Air | Parameter | D 16 – 2NT | | | D 20 – 3NT | | | D 25 – 4NT | | | D 32 & D 35 – 5NT | | | D 40 & D 42 – 6NT | | |
|--|---|----|----|----------|------|-----|---------------------------|------------|-------|------|------------|-------|------|------------|-------|------|-------------------|-------|------|-------------------|-------|-------|
| | 30 | 40 | 50 | | | | | 3D–5D | 5D–7D | > 7D | 3D–5D | 5D–7D | > 7D | 3D–5D | 5D–7D | > 7D | 3D–5D | 5D–7D | > 7D | 3D–5D | 5D–7D | > 7D |
| | | | | | | | | | | | | | | | | | | | | | | |
| I Carbon-Steel Alloy-Steel <30HRC | | | | | | | V _c (m/min) | 180 | 160 | 140 | 180 | 160 | 140 | 180 | 160 | 140 | 180 | 160 | 140 | 180 | 160 | 140 |
| | | | | | | | n (min ⁻¹) | 3581 | 3183 | 2785 | 2865 | 2546 | 2228 | 2292 | 2037 | 1783 | 1790 | 1592 | 1393 | 1432 | 1273 | 1114 |
| | | | | | | | f _z feed/tooth | 1.2 | 1 | 0.8 | 1.2 | 1 | 0.8 | 1.2 | 1 | 0.8 | 1.2 | 1 | 0.8 | 1.2 | 1 | 0.8 |
| | | | | | | | V _f (mm/min) | 8594 | 6366 | 4456 | 10313 | 7639 | 5348 | 11001 | 8149 | 5704 | 10743 | 7958 | 5570 | 10313 | 7639 | 5348 |
| | | | | | | | a _p (mm) | 0.8 | 0.6 | 0.4 | 0.8 | 0.6 | 0.5 | 0.8 | 0.6 | 0.5 | 0.8 | 0.6 | 0.5 | 0.8 | 0.6 | 0.5 |
| | | | | | | | a _e (mm) | 10 | 10 | 10 | 14 | 14 | 14 | 19 | 19 | 19 | 22 | 22 | 22 | 28 | 28 | 28 |
| | | | | | | | Q (cm ³ /min) | 68.8 | 38.2 | 17.8 | 115.5 | 64.2 | 37.4 | 167.2 | 92.9 | 54.2 | 189.1 | 105.0 | 61.3 | 231.0 | 128.3 | 74.9 |
| II Pre-Hard- ened Steel 30 – 40 HRC | | | | | | | V _c (m/min) | 150 | 130 | 110 | 150 | 130 | 110 | 150 | 130 | 110 | 150 | 130 | 110 | 150 | 130 | 110 |
| | | | | | | | n (min ⁻¹) | 2984 | 2586 | 2188 | 2387 | 2069 | 1751 | 1910 | 1655 | 1401 | 1492 | 1293 | 1094 | 1194 | 1035 | 875 |
| | | | | | | | f _z feed/tooth | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 |
| | | | | | | | V _f (mm/min) | 5968 | 4138 | 2626 | 7162 | 4966 | 3151 | 7639 | 5297 | 3361 | 7460 | 5173 | 3283 | 7162 | 4966 | 3151 |
| | | | | | | | a _p (mm) | 0.8 | 0.6 | 0.4 | 0.8 | 0.6 | 0.5 | 0.8 | 0.6 | 0.5 | 0.8 | 0.6 | 0.5 | 0.8 | 0.6 | 0.5 |
| | | | | | | | a _e (mm) | 10 | 10 | 10 | 14 | 14 | 14 | 19 | 19 | 19 | 22 | 22 | 22 | 28 | 28 | 28 |
| | | | | | | | Q (cm ³ /min) | 47.7 | 24.8 | 10.5 | 80.2 | 41.7 | 22.1 | 116.1 | 60.4 | 31.9 | 131.3 | 68.3 | 36.1 | 160.4 | 83.4 | 44.1 |
| III Hardened Steel 40 – 55 HRC | | | | | | | V _c (m/min) | 100 | 85 | 70 | 100 | 85 | 70 | 100 | 85 | 70 | 100 | 85 | 70 | 100 | 85 | 70 |
| | | | | | | | n (min ⁻¹) | 1989 | 1691 | 1393 | 1592 | 1353 | 1114 | 1273 | 1082 | 891 | 995 | 846 | 696 | 796 | 676 | 557 |
| | | | | | | | f _z feed/tooth | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 |
| | | | | | | | V _f (mm/min) | 3979 | 2706 | 1671 | 4775 | 3247 | 2005 | 5093 | 3463 | 2139 | 4974 | 3382 | 2089 | 4775 | 3247 | 2005 |
| | | | | | | | a _p (mm) | 0.6 | 0.5 | 0.4 | 0.6 | 0.5 | 0.4 | 0.6 | 0.5 | 0.4 | 0.6 | 0.5 | 0.4 | 0.6 | 0.5 | 0.4 |
| | | | | | | | a _e (mm) | 10 | 10 | 10 | 14 | 14 | 14 | 19 | 19 | 19 | 22 | 22 | 22 | 28 | 28 | 28 |
| | | | | | | | Q (cm ³ /min) | 23.9 | 13.5 | 6.7 | 40.1 | 22.7 | 11.2 | 58.1 | 32.9 | 16.3 | 65.7 | 37.2 | 18.4 | 80.2 | 45.5 | 22.5 |
| IV Stainless Steels SUS | | | | | | | V _c (m/min) | 120 | 100 | 80 | 120 | 100 | 80 | 120 | 100 | 80 | 120 | 100 | 80 | 120 | 100 | 80 |
| | | | | | | | n (min ⁻¹) | 2387 | 1989 | 1592 | 1910 | 1592 | 1273 | 1528 | 1273 | 1019 | 1194 | 995 | 796 | 955 | 796 | 637 |
| | | | | | | | f _z feed/tooth | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 |
| | | | | | | | V _f (mm/min) | 4775 | 3183 | 1910 | 5730 | 3820 | 2292 | 6112 | 4074 | 2445 | 5968 | 3979 | 2387 | 5730 | 3820 | 2292 |
| | | | | | | | a _p (mm) | 0.6 | 0.5 | 0.4 | 0.6 | 0.5 | 0.4 | 0.6 | 0.5 | 0.4 | 0.6 | 0.5 | 0.4 | 0.6 | 0.5 | 0.4 |
| | | | | | | | a _e (mm) | 10 | 10 | 10 | 14 | 14 | 14 | 19 | 19 | 19 | 22 | 22 | 22 | 28 | 28 | 28 |
| | | | | | | | Q (cm ³ /min) | 28.6 | 15.9 | 7.6 | 48.1 | 26.7 | 12.8 | 69.7 | 38.7 | 18.6 | 78.8 | 43.8 | 21.0 | 96.3 | 53.5 | 25.7 |
| V Cast-Iron GG EN-JL10** EN-GJL*** | | | | | | | V _c (m/min) | 200 | 180 | 160 | 200 | 180 | 160 | 200 | 180 | 160 | 200 | 180 | 160 | 200 | 180 | 160 |
| | | | | | | | n (min ⁻¹) | 3979 | 3581 | 3183 | 3183 | 2865 | 2546 | 2546 | 2292 | 2037 | 1989 | 1790 | 1592 | 1592 | 1432 | 1273 |
| | | | | | | | f _z feed/tooth | 1.5 | 1.3 | 1.1 | 1.5 | 1.3 | 1.1 | 1.5 | 1.3 | 1.1 | 1.5 | 1.3 | 1.1 | 1.5 | 1.3 | 1.1 |
| | | | | | | | V _f (mm/min) | 11937 | 9311 | 7003 | 14324 | 11173 | 8403 | 15279 | 11918 | 8964 | 14921 | 11638 | 8754 | 14324 | 11173 | 8403 |
| | | | | | | | a _p (mm) | 0.8 | 0.6 | 0.5 | 0.8 | 0.6 | 0.5 | 0.8 | 0.6 | 0.5 | 0.8 | 0.6 | 0.5 | 0.8 | 0.6 | 0.5 |
| | | | | | | | a _e (mm) | 10 | 10 | 10 | 14 | 14 | 14 | 19 | 19 | 19 | 22 | 22 | 22 | 28 | 28 | 28 |
| | | | | | | | Q (cm ³ /min) | 95.5 | 55.9 | 35.0 | 160.4 | 93.9 | 58.8 | 232.2 | 135.9 | 85.2 | 262.6 | 153.6 | 96.3 | 320.9 | 187.7 | 117.6 |
| Cast-Iron GGG EN-JS10** EN-GJS*** | | | | | | | V _c (m/min) | 160 | 140 | 120 | 160 | 140 | 120 | 160 | 140 | 120 | 160 | 140 | 120 | 160 | 140 | 120 |
| | | | | | | | n (min ⁻¹) | 3183 | 2785 | 2387 | 2546 | 2228 | 1910 | 2037 | 1783 | 1528 | 1592 | 1393 | 1194 | 1273 | 1114 | 955 |
| | | | | | | | f _z feed/tooth | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 | 1 | 0.8 | 0.6 |
| | | | | | | | V _f (mm/min) | 6366 | 4456 | 2865 | 7639 | 5348 | 3438 | 8149 | 5704 | 3667 | 7958 | 5570 | 3581 | 7639 | 5348 | 3438 |
| | | | | | | | a _p (mm) | 0.8 | 0.6 | 0.4 | 0.8 | 0.6 | 0.4 | 0.8 | 0.6 | 0.4 | 0.8 | 0.6 | 0.4 | 0.8 | 0.6 | 0.4 |
| | | | | | | | a _e (mm) | 10 | 10 | 10 | 14 | 14 | 14 | 19 | 19 | 19 | 22 | 22 | 22 | 28 | 28 | 28 |
| | | | | | | | Q (cm ³ /min) | 50.9 | 26.7 | 11.5 | 85.6 | 44.9 | 19.3 | 123.9 | 65.0 | 27.9 | 140.1 | 73.5 | 31.5 | 171.1 | 89.8 | 38.5 |

NOTE:

Use a highly rigid and accurate machine as possible. If the rpm available is lower than recommended, please reduce the feed rate by the same ratio.

Please use CAM-R for your programming corner radius. For precise tool definition in CAM systems, please download DXF data (QuickFinder) or contact your local MOLDINO Tool Process Optimizer for more details.

Please set up ramping angle ≤ 0.5°.

Use the appropriate coolant for the work material and machining shape. We recommend air blow as first choice for cooling system.

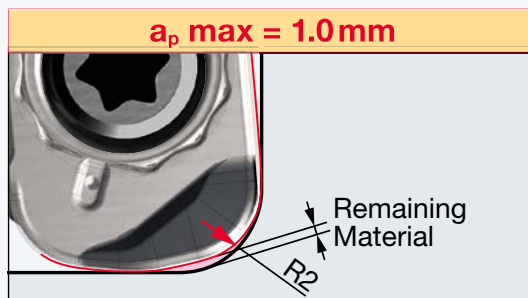
These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and workpiece conditions.

TD4N | Recommended Cutting Conditions

CAM Radius

In CAM, define the tool shape as an R 2.0 radius shape.
 Use with axial-direction cutting depths a_p of 1.0 mm or less.

| Tool definition shape on CAM | Remains (mm) | Over Cut (mm) |
|------------------------------|--------------|---------------|
| R 3.0 | 0 | 0.4 |
| R 2.0 | 0.2 | 0 |
| R 1.5 | 0.3 | 0 |



Please note:

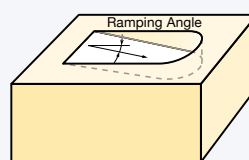
- Please note that the GX2140 does not cause a reaction in conductive touch sensors.
- To prevent tool damage due to chip clogging, always use a chip removal method such as an air blower, etc.
- Exchange inserts at the correct time to ensure safety of the tool holder.
- The following equation can be used to determine the metal removal rate per unit time Q:

$$Q \text{ (cm}^3\text{/min)} = \frac{a_p \text{ (mm)} \cdot a_e \text{ (mm)} \cdot V_f \text{ (mm/min)}}{1000}$$
- Do not set values higher than the maximum value.

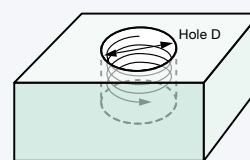
Ramping / Helical Milling

Ramping

Ramping is possible. Please use the following data for direct milling without pre-drilling any starter holes.



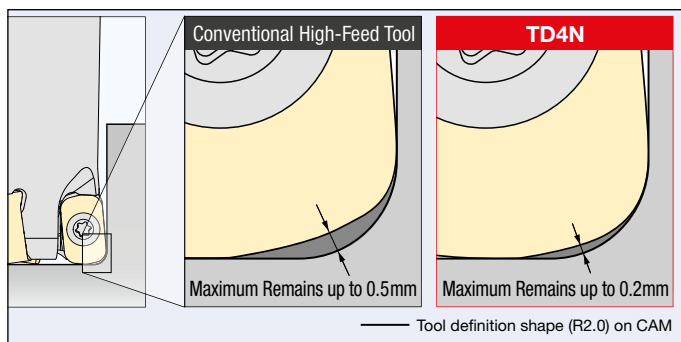
Ramping



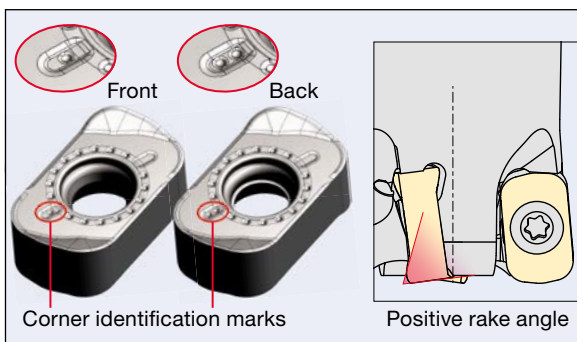
Helical Milling

| Tool Diameter D mm | D 16 | D 20 | D 25 | D 32 | D 35 | D 40 | D 42 |
|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|
| Max. Ramping Angle° | 0.8 | 0.8 | 0.8 | 0.5 | 0.5 | 0.3 | 0.3 |
| Recommended Ramping Angle° | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.2 | 0.2 |
| Hole D (mm) | 24–30 | 32–38 | 42–48 | 56–62 | 62–68 | 72–78 | 76–82 |

Reduces uncut Remnants on Workpieces



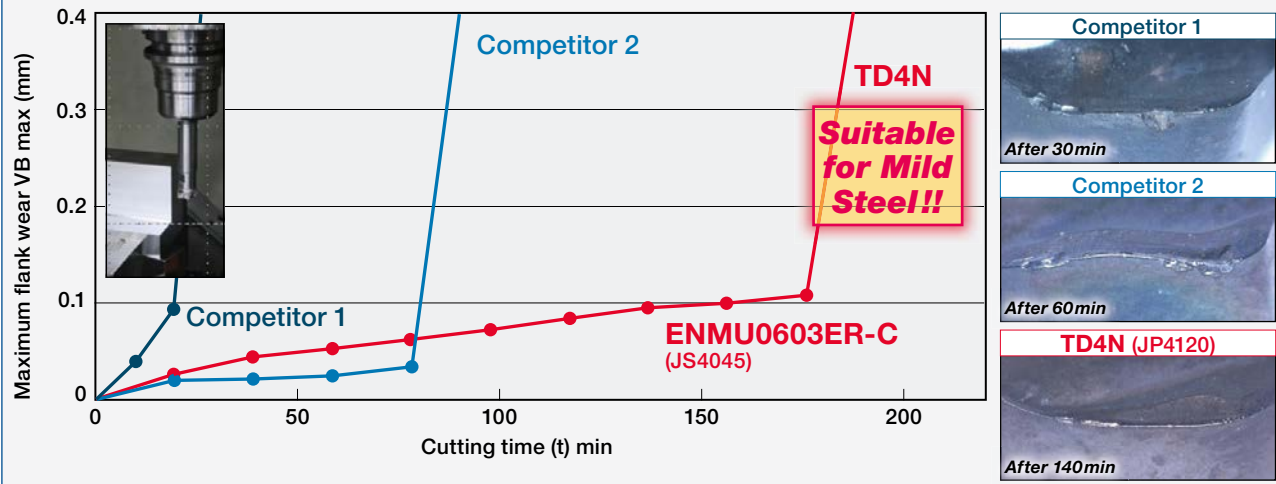
Economical 4-Corner-Use Inserts



TD4N | Technical Data | Machining Examples

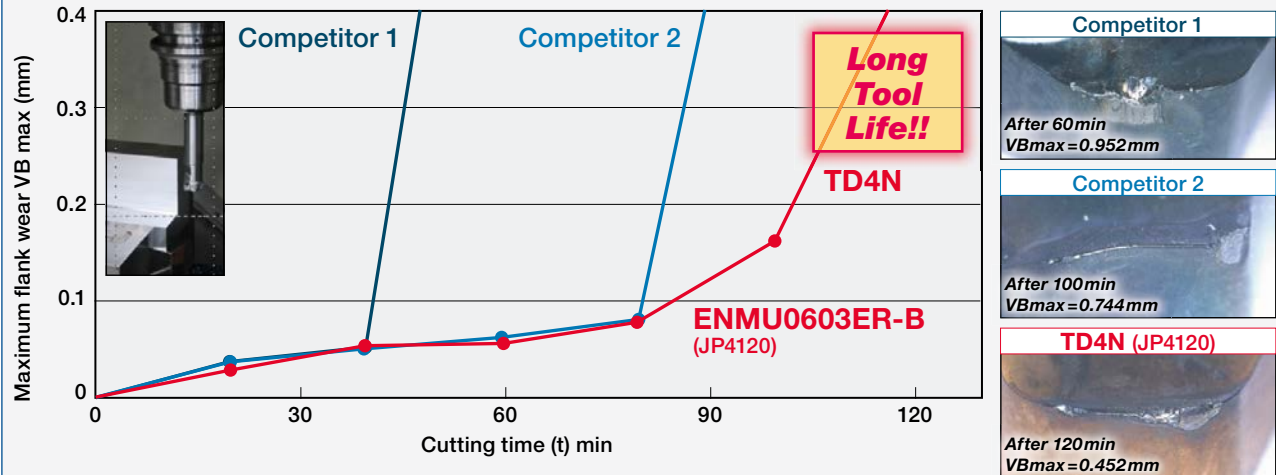
Tool life: Mild steel (C45S – 200HB)

Tool Diameter 25 mm | Spindle: HSK-A100 | CCs: $V_c = 100\text{m/min}$ | $f_z = 1.0\text{mm/t}$ | $a_p \times a_e = 0.6 \times 16\text{mm}$ | OH = 80 mm | Dry



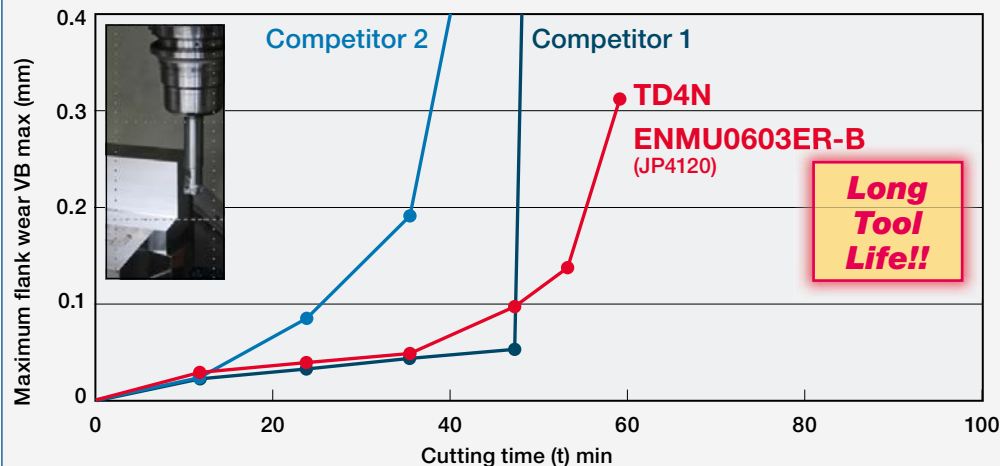
Tool life: Pre-hardened steel (1.2344 – 45HRC)

Tool Diameter 25 mm | Spindle: HSK-A100 | CCs: $V_c = 100\text{m/min}$ | $f_z = 0.8\text{mm/t}$ | $a_p \times a_e = 0.6 \times 16\text{mm}$ | OH = 80 mm | Dry



Tool life: Hardened steel (1.2083 – 50HRC)

Tool Diameter 25 mm | Spindle: HSK-A100 | CCs: $V_c = 100\text{m/min}$ | $f_z = 1.0\text{mm/t}$ | $a_p \times a_e = 0.6 \times 16\text{mm}$ | OH = 80 mm | Dry

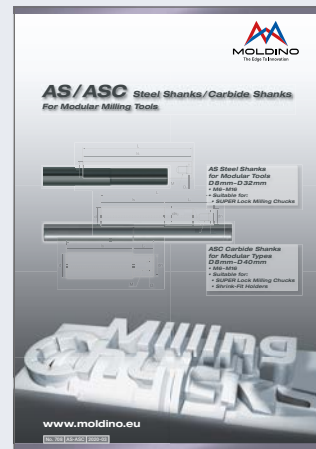


➔ For more information about Modular Tools and available Shanks please check our brochures:

Indexable Modular No. 328.x



AS/ASC Shanks No. 708.x



Always up to date: Please check our P50 QuickFinder



Attentions on Safety

1. Cautions regarding handling

- (1) When removing the tool from its case (packaging), be careful that the tool does not pop out or is dropped. Be particularly careful regarding contact with the tool flutes.
- (2) When handling tools with sharp cutting flutes, be careful not to touch the cutting flutes directly with your bare hands.

2. Cautions regarding mounting

- (1) Before use, check the outside appearance of the tool for scratches, cracks, etc. and that it is firmly mounted in the collet chuck, etc.
- (2) When preparing for use, be sure that the inserts are firmly mounted in place and that they are firmly mounted on the arbor, etc.
- (3) If abnormal chattering, etc. occurs during use, stop the machine immediately and remove the cause of the chattering.

3. Cautions during use

- (1) Before use, confirm the dimensions and direction of rotation of the tool and milling work material.
- (2) The numerical values in the standard cutting conditions table should be used as criteria when starting new work. The cutting conditions should be adjusted as appropriate when the cutting depth is large, the rigidity of the machine being used is low, or according to the conditions of the work material.
- (3) Cutting tools are made of a hard material. During use, they may break and fly off. In addition, cutting chips may also fly off. Since there is a danger of injury to workers, fire, or eye damage from such flying pieces, a safety cover should be attached when work is performed and safety equipment such as safety goggles should be worn to create a safe environment for work.
- (4) There is a risk of fire or inflammation due to sparks, heat due to breakage, and cutting chips. Do not use where there is a risk of fire or explosion. Please caution of fire while using oil base coolant, fire prevention is necessary.
- (5) Do not use the tool for any purpose other than that for which it is intended.

4. Cautions regarding regrinding

- (1) If regrinding is not performed at the proper time, there is a risk of the tool breaking. Replace the tool with one in good condition, or perform regrinding.
- (2) Grinding dust will be created when regrinding a tool. When regrinding, be sure to attach a safety cover over the work area and wear safety clothes such as safety goggles, etc.
- (3) This product contains the specified chemical substance cobalt and its inorganic compounds. When performing regrinding or similar processing, be sure to handle the processing in accordance with the local laws and regulations regarding prevention of hazards due to specified chemical substances.

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Specifications for the products listed in this catalog are subject to change without notice due to replacement or modification.

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