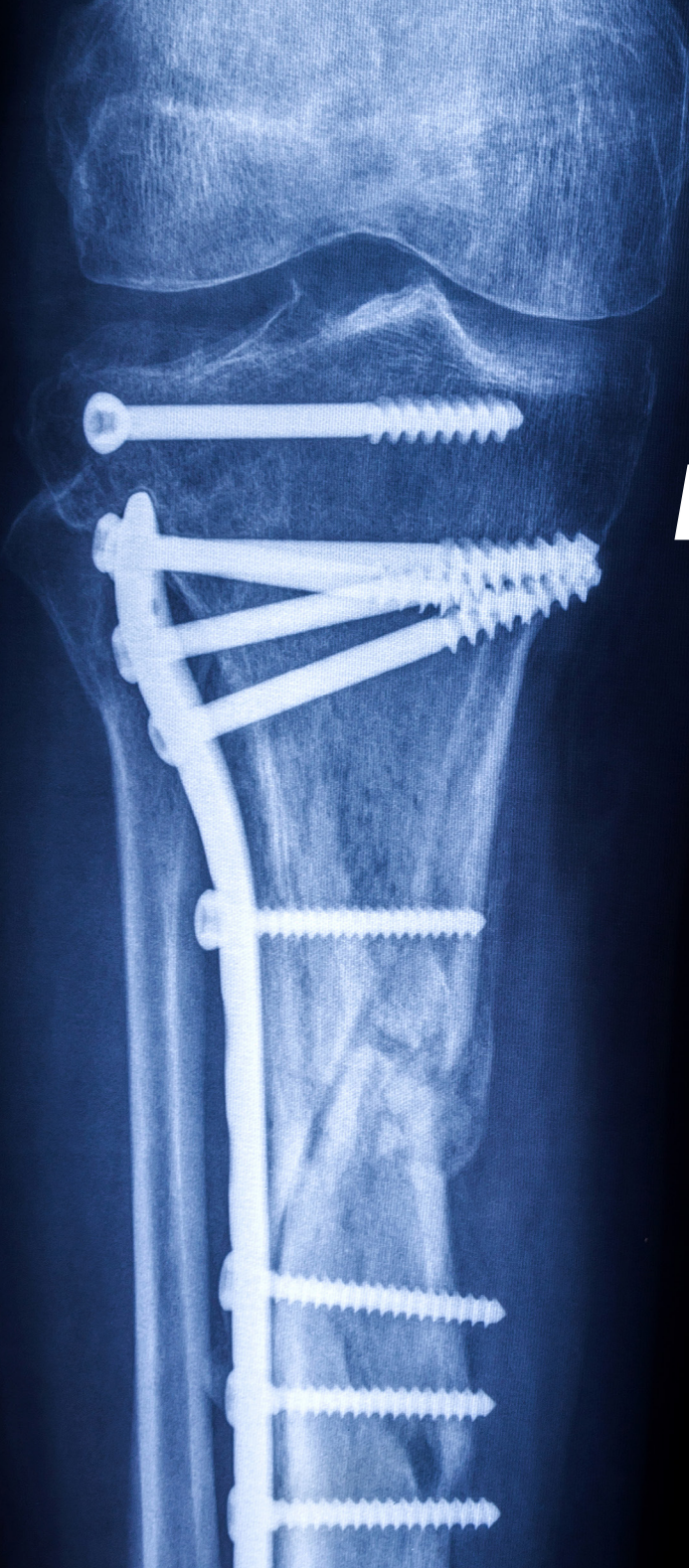


TOOLING SOLUTIONS FOR
**MEDICAL
BONE SCREWS**

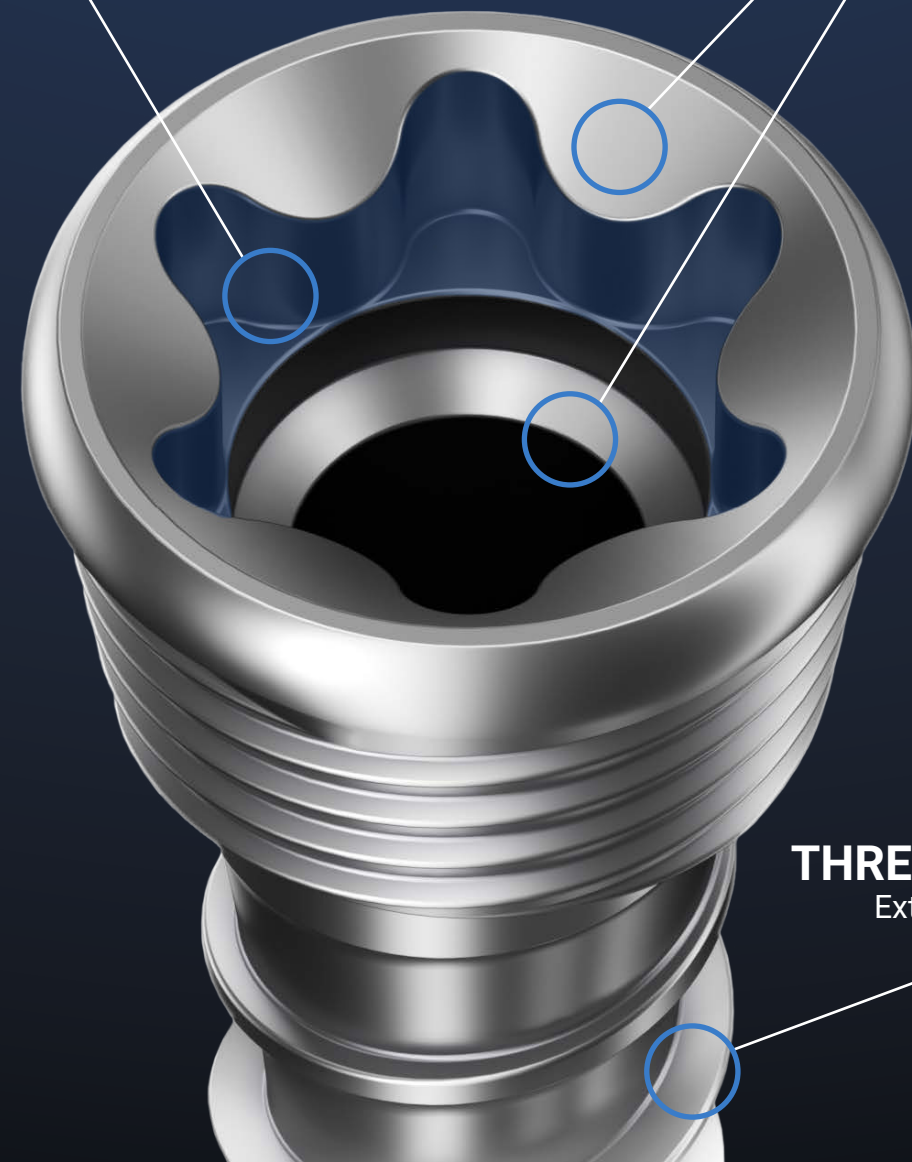


FRONT TO BACK

COMPLETE BONE SCREW SOLUTION

HEXALOBE MILL
High efficient milling

HEXALOBE DRILL
Drill, Chamfer & Deburr



THREAD WHIRLING
External threading

THREAD WHIRLING

OD Whirling

GWS thread whirling inserts are designed for medical grade materials including titanium, cobalt-chrome, and stainless steel. Proprietary substrates and coating technology reduce costs via improved process times and extended life while maximizing precision.

Applications

- Medical Bone Screws
- Orthodontia Screws



5 BENEFITS

Thread Whirling with GWS

1

Substantially faster cycle times versus single point threading

2

Longer tool life with faster tool changeovers

3

Exceptional surface finish

4

High degree of geometric accuracy

5

No burrs after production

THREAD WHIRLING CAPABILITY



Whirling Cartridges

- Most popular types possible
- Made to order

Multiple grades & coatings available

- Performance Grade Uncoated - for short production run
- Performance Grade Coated - for short or long production runs
- ZOMBIE WHIRLER - high performance grade & proprietary coating - for production runs where cost-per-part and tool life



Lead Times

1st piece samples as fast as 72hrs



Scan here to discover more information.

FEATURES & BENEFITS

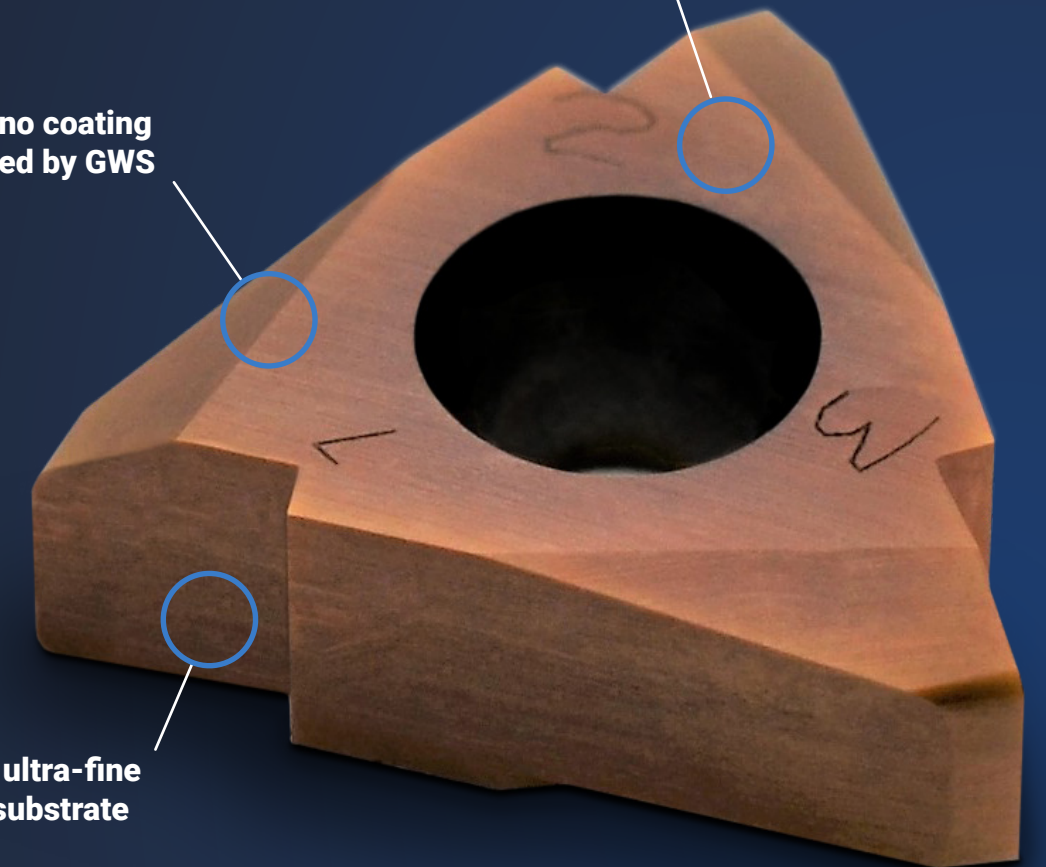
The ZOMBIE WHIRLER™ is the premiere whirling insert for the external threading of Titanium, Stainless Steel and Cobalt-Chrome. It combines proprietary substrate, geometry and coating technologies ideal for customers looking for maximum life and cost-per-unit payback.

- 1st Piece Testing Samples: 48-72hrs
- Product Delivery: 2-4 weeks
- Made in the USA

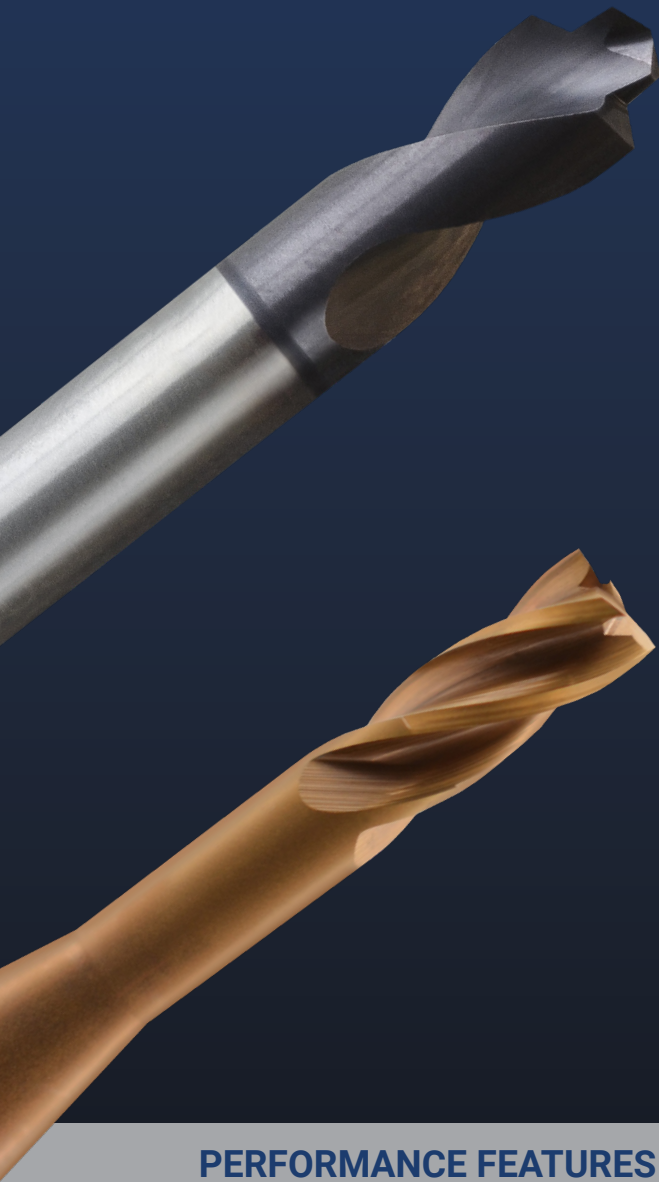
Material-specific geometry designed for 6Al4V and 300/400SS

Proprietary FX7-nano coating developed and coated by GWS

Premium ultra-fine carbide substrate



FEATURES & BENEFITS



Combined Drill

Diameter Range - Standard diameters for pre-hole drilling "Torx" socket from T4 to T30.

Coating - Chrome-free coating.

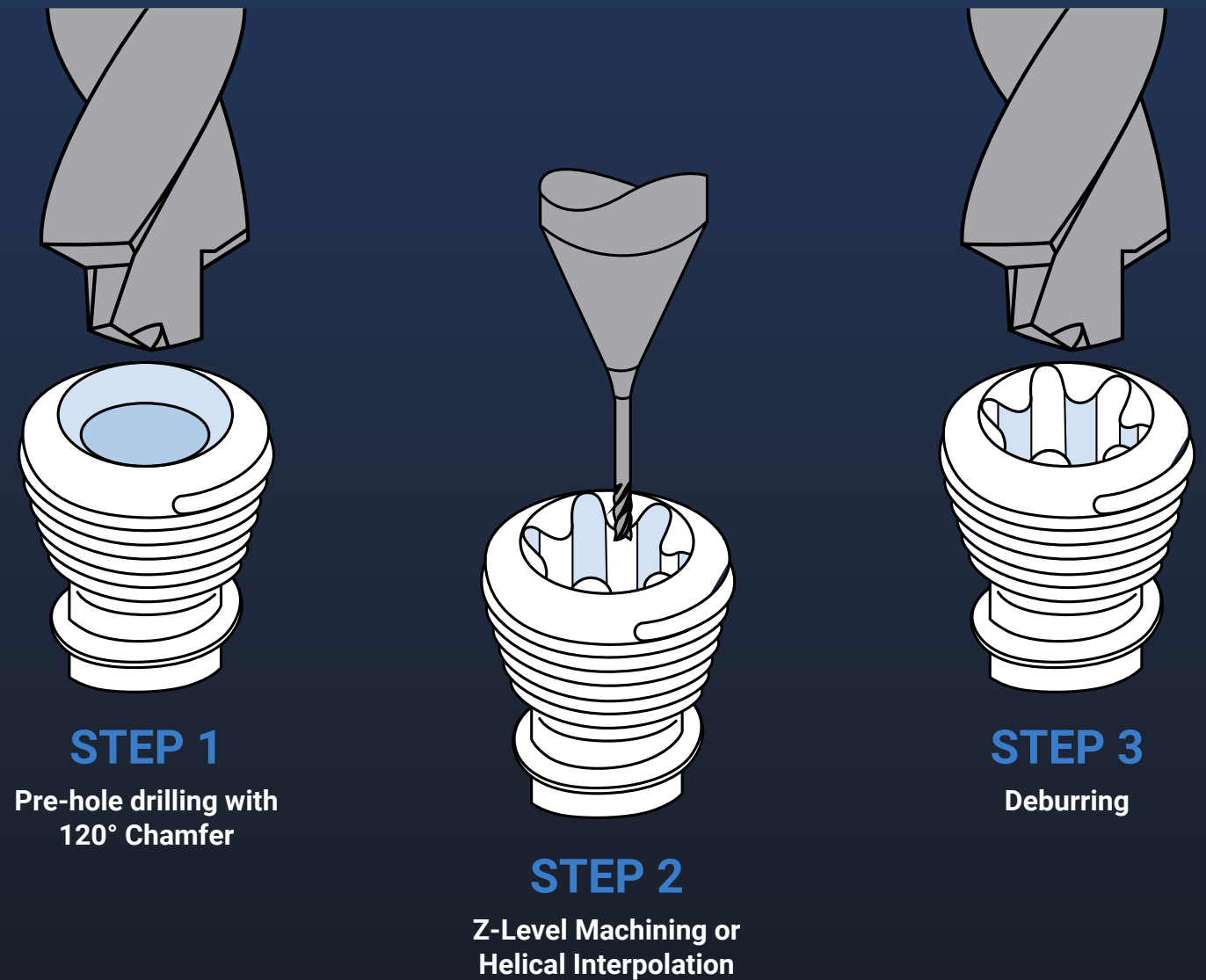
On Request - Special sizes available on request.

Micro End Mill

New Carbide - A special micro-grain carbide with high stiffness and edge chipping resistance has been developed to guarantee high profile precision.

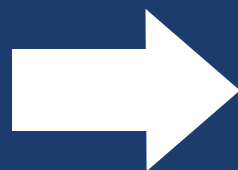
Coating - GWS's own FX7m coating for stainless steel and Titanium. This nano PVD coating is developed specifically for micro tools and ensures heat and wear resistance without edge rounding.

HEXALOBE PROCESSING



PERFORMANCE FEATURES

Maximum Rigidity
Material-Specific Geometry
Advanced Micro PVD Coating Technology



YOUR ADVANTAGES

Reduced Cycle Times
High Precision
Excellent Surface Finish
Reduced or Eliminated Burr

A TURNKEY SOLUTION FOR HEXALOBULAR SOCKETS



Reduced Cycle Time



Improved Finish



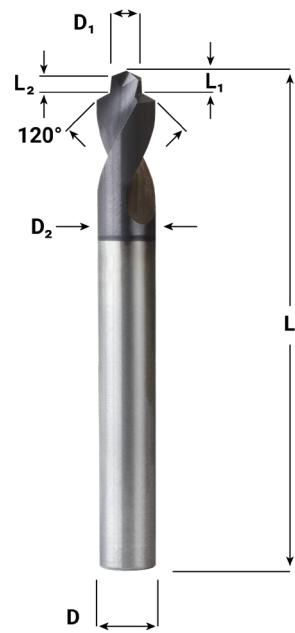
Reduced Burr



Higher Precision

ULTIMATE PERFORMANCE

Carbide Hexalobe Step Drills For Bone Screws



| FEATURES/DESCRIPTION | | APPLICATION | FEATURES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|----|-------------|-----------|------|-----------|----|-------------|-----------|------|-----------|----------------|-------------|--|------|--|----------------|--|----|----|----|----|----|----|----|----|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEXADRILL Drill - Chamfer - Deburr For Torx Screw | | | CARBIDE | NEW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <ul style="list-style-type: none"> Designed for the drilling and deburring of bone screws Standard diameters for pre-hole drilling "Torx" socket from T4 to T30 Chrome-free coating Designed for use with Hexamill - Series 2150 | | | 2FL | 140° | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | h6 | FX5m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | 30° | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th colspan="3">STEEL</th> <th colspan="2">STAINLESS</th> <th colspan="2">CAST IRON</th> <th colspan="2">NON-FERROUS</th> <th colspan="2">HRSA</th> <th colspan="2">HARDENED STEEL</th> </tr> <tr> <th>P1</th><th>P2</th><th>P3</th> <th>M1</th><th>M2</th> <th>K1</th><th>K2</th> <th>N1</th><th>N2</th> <th>S1</th><th>S2</th> <th>H1</th><th>H2</th> </tr> </thead> <tbody> <tr> <td>○</td><td>○</td><td>○</td> <td>●</td><td>●</td> <td>○</td><td>○</td> <td>○</td><td>○</td> <td>○</td><td>○</td> <td>○</td><td>○</td> </tr> </tbody> </table> | | | | | STEEL | | | STAINLESS | | CAST IRON | | NON-FERROUS | | HRSA | | HARDENED STEEL | | P1 | P2 | P3 | M1 | M2 | K1 | K2 | N1 | N2 | S1 | S2 | H1 | H2 | ○ | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| STEEL | | | STAINLESS | | CAST IRON | | NON-FERROUS | | HRSA | | HARDENED STEEL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P1 | P2 | P3 | M1 | M2 | K1 | K2 | N1 | N2 | S1 | S2 | H1 | H2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ○ | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

● Best ○ Good

Series 4060 | HXD | 2FL | Metric

| Torx Type | D ₁ (mm) | L ₁ (mm) | D ₂ (mm) | L ₂ (mm) | D (mm) | L (mm) | EDP |
|-----------|---------------------|---------------------|---------------------|---------------------|--------|--------|---------|
| T4 | 0.9 | 0.70 | 1.7 | 0.56 | 3 | 40 | 4060001 |
| T5 | 1.0 | 0.87 | 2.0 | 0.72 | 3 | 40 | 4060002 |
| T5 | 1.0 | 0.75 | 2.0 | 0.59 | 3 | 40 | 4060003 |
| T6 | 1.2 | 1.06 | 2.2 | 0.88 | 3 | 40 | 4060004 |
| T6 | 1.2 | 0.86 | 2.2 | 0.67 | 3 | 40 | 4060005 |
| T7 | 1.4 | 1.05 | 3.0 | 0.83 | 3 | 40 | 4060006 |
| T7 | 1.4 | 1.01 | 3.0 | 0.79 | 3 | 40 | 4060007 |
| T8 | 1.6 | 1.40 | 3.0 | 1.15 | 3 | 40 | 4060008 |
| T8 | 1.6 | 1.05 | 3.0 | 0.81 | 3 | 40 | 4060009 |
| T10 | 1.9 | 1.42 | 4.0 | 1.13 | 4 | 40 | 4060010 |
| T15 | 2.3 | 1.78 | 4.0 | 1.42 | 4 | 50 | 4060011 |
| T20 | 2.7 | 2.12 | 5.0 | 1.70 | 6 | 50 | 4060012 |
| T25 | 3.1 | 2.84 | 6.0 | 2.36 | 6 | 50 | 4060013 |
| T30 | 3.8 | 3.52 | 6.0 | 2.93 | 6 | 50 | 4060014 |
| T30 | 3.8 | 3.04 | 6.0 | 2.45 | 6 | 50 | 4060015 |

ULTIMATE PERFORMANCE

Carbide Hexalobe Micro End Mills For Bone Screws



| FEATURES/DESCRIPTION | | APPLICATION | FEATURES | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|----|-------------|-----------|-----|-----------|----|-------------|-----------|------|-----------|----------------|-------------|--|------|--|----------------|--|----|----|----|----|----|----|----|----|----|----|----|----|----|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEXAMILL Torq Screw Milling | | | CARBIDE | NEW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <ul style="list-style-type: none"> Premium sub-micron grade carbide substrate for wear resistance Micro end mills designed for the milling of medical-grade bone screws and components Features FX7 micro coating for small diameter end mills Designed for use with HexaDrill, Series 4060 | | | SQ | 25° | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | h6 | FX7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| STEEL | | | STAINLESS | | CAST IRON | | NON-FERROUS | | HRSA | | HARDENED STEEL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P1 | P2 | P3 | M1 | M2 | K1 | K2 | N1 | N2 | S1 | S2 | H1 | H2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ○ | ○ | ○ | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

● Best ○ Good

Series 2150 | HXM | Multi Flute | Square | Metric

| Torx Type | Diameter (mm) | Reach (L ₁) | LDR (xD) | LOC (L ₂) | Neck Dia (D ₂) | Shank (D) | OAL (L) | Flutes | EDP |
|-----------|---------------|-------------------------|----------|-----------------------|----------------------------|-----------|---------|--------|---------|
| T4 | 0.20 | 0.70 | 3X | 0.30 | 0.19 | 3 | 40 | 3 | 2150001 |
| | | 1.00 | 5X | 0.30 | 0.19 | 3 | 40 | 3 | 2150002 |
| T5 | 0.25 | 0.88 | 3X | 0.40 | 0.23 | 3 | 40 | 3 | 2150003 |
| | | 1.25 | 5X | 0.40 | 0.23 | 3 | 40 | 3 | 2150004 |
| T6 / T7 | 0.30 | 1.05 | 3X | 0.45 | 0.28 | 3 | 40 | 3 | 2150005 |
| | | 1.50 | 5X | 0.45 | 0.28 | 3 | 40 | 3 | 2150006 |
| T8 / T10 | 0.40 | 1.40 | 3X | 0.60 | 0.38 | 3 | 40 | 3 | 2150007 |
| | | 2.00 | 5X | 0.60 | 0.38 | 3 | 40 | 3 | 2150008 |
| T10 / T15 | 0.50 | 1.75 | 3X | 0.75 | 0.47 | 3 | 40 | 4 | 2150009 |
| | | 2.50 | 5X | 0.75 | 0.47 | 3 | 40 | 4 | 2150010 |
| T20 | 0.60 | 2.10 | 3X | 0.90 | 0.56 | 3 | 40 | 4 | 2150011 |
| | | 3.00 | 5X | 0.90 | 0.56 | 3 | 40 | 4 | 2150012 |
| T25 | 0.80 | 2.80 | 3X | 1.20 | 0.75 | 3 | 40 | 4 | 2150013 |
| | | 4.00 | 5X | 1.20 | 0.75 | 3 | 40 | 4 | 2150014 |
| T30 | 1.00 | 3.50 | 3X | 1.50 | 0.94 | 3 | 40 | 4 | 2150015 |
| | | 5.00 | 5X | 1.50 | 0.94 | 3 | 40 | 4 | 2150016 |

Series 4060

Carbide Step Drill for "Torx" Style Bone Screws

| Work Material | | M | S2 |
|---------------|---------------|----------------|--------------------|
| | | 316L, X2CrNiMo | Ti6Al4V, ASTM B348 |
| m/min | | 25 - 35 | 20 - 30 |
| Torx type | Diameter (mm) | mm/rev | mm/rev |
| T4 | 0.9 | 0.02 - 0.03 | 0.01 - 0.015 |
| T5 | 1.0 | 0.02 - 0.03 | 0.01 - 0.015 |
| T6 | 1.2 | 0.03 - 0.04 | 0.015 - 0.02 |
| T7 | 1.4 | 0.03 - 0.04 | 0.015 - 0.02 |
| T8 | 1.6 | 0.03 - 0.04 | 0.015 - 0.02 |
| T10 | 1.9 | 0.05 - 0.06 | 0.02 - 0.03 |
| T15 | 2.3 | 0.05 - 0.06 | 0.02 - 0.03 |
| T20 | 2.7 | 0.06 - 0.07 | 0.03 - 0.04 |
| T25 | 3.1 | 0.07 - 0.08 | 0.03 - 0.04 |
| T30 | 3.8 | 0.07 - 0.08 | 0.03 - 0.04 |

Series 2150

HXM | Multi Flute | Square | Metrix

| Work Material | | M | | S2 | |
|---------------|---------------|--------------------------------|-----------------|--------------------|-----------------|
| | | 316L, X2CrNiMo | | Ti6Al4V, ASTM B348 | |
| Depth of Cut | | Axial: 0.5 X D Radial: 0.1 X D | | | |
| Torx type | Diameter (mm) | m/min | mm/rev | m/min | mm/rev |
| T4 | 0.20 | 20 - 40 | 0.001 - 0.0015 | 15 - 35 | 0.001 - 0.0015 |
| T5 | 0.25 | 25 - 45 | 0.0015 - 0.0020 | 20 - 40 | 0.0015 - 0.0020 |
| T6 - T7 | 0.3 | 30 - 55 | 0.0025 - 0.0030 | 25 - 50 | 0.0025 - 0.0030 |
| T8 - T10 | 0.4 | 35 - 70 | 0.0035 - 0.0040 | 30 - 65 | 0.0035 - 0.0040 |
| T10 - T15 | 0.5 | 50 - 90 | 0.0050 - 0.0060 | 45 - 85 | 0.0050 - 0.0060 |
| T20 | 0.6 | 55 - 100 | 0.0060 - 0.0065 | 50 - 90 | 0.0060 - 0.0065 |
| T25 | 0.8 | 70 - 135 | 0.0070 - 0.0080 | 60 - 125 | 0.0070 - 0.0080 |
| T30 | 1.0 | 75 - 140 | 0.0095 - 0.0100 | 70 - 130 | 0.0095 - 0.0100 |

* Helical interpolation only recommended in Titanium Alloys
 * For helical interpolation, reduce feed by 50-60%
 * Recommended pitch for helical interpolation = 0.2 to 0.4 X D



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CUSTOM COMES STANDARD