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Tung TECH

Tungaloy Technical Articles



TurnLine

DOMTURN
EXTERNAL LINE

for Precision Machining

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A recent trend in automotive, aerospace, and general machining industries is to produce smaller and more precise parts to reduce the weight and increase their performance. To meet this market demand, Tungaloy has developed **DoMiniTurn - External Line** series for machining small, precision parts on automatic lathes and small-sized CNC lathes.

INSERTS & CHIPBREAKERS:

DoMiniTurn series uses double-sided inserts with sharp cutting edges. Double-sided inserts are usually negative, which have no relief angle. The relief angle is created by tipping the insert pocket at a negative rake angle. The problem of the negative cutting angle is that it increases cutting force, which is often a disadvantage in machining small parts, components with thin walls, or gummy materials, such as stainless steel, low carbon steel, superalloys, and aluminum.

Thus, a better option is to use positive inserts. Positive inserts have relief and sit in the pocket at a neutral or even positive rake angle. This positive angle reduces cutting force, which is ideal for machining small or thin-walled parts and also most desirable for gummy materials. However, positive inserts are single-sided and the cost per cutting edge is expensive.

"Tungaloy's new DoMiniTurn series delivers the advantages of positive inserts and the productivity of double-sided inserts"



N° 0001 February 2015 "DoMiniTurn for Precision Machining"

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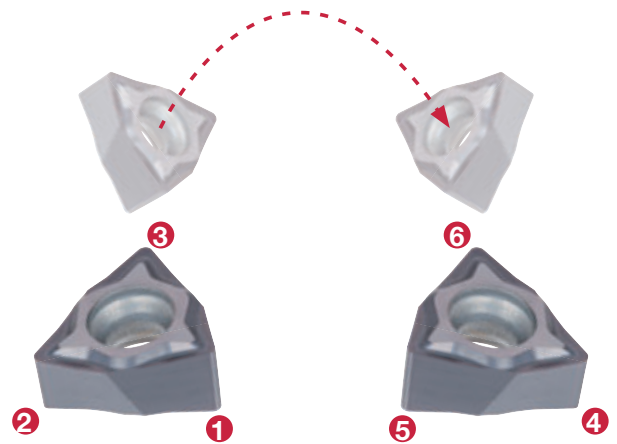


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The inserts are available in two geometries: WXGU and DXGU types. WXGU has six cutting edges and will replace CCMT, which has only two. The included angle of WXGU is 80 degree, which is ideal for turning and facing. As for DXGU, it will replace DCMT. DXGU has four cutting edges while DCMT has two. The included angle of DXGU is 55 degree, and it is ideal for turning, facing and profiling applications.

Both insert geometries are offered in JTS and JSS chipbreakers. JTS chipbreaker is recommended for steel and JSS for gummy materials such as stainless steel, low carbon steel and superalloys. Inserts with JTS or JSS chipbreaker have minus tolerance on the corner radius and are suitable for precision machining and parts with small radii.

DoMiniTurn insert series includes AH725 with PremiumTec, a PVD-coated carbide grade. This grade has well-balanced wear and chipping resistances, providing stable, long tool life in a wide variety of turning applications and workpiece materials.



TOOLHOLDERS:

Toolholders in **DoMiniTurn series** have an insert pocket with dovetail design (Fig. 1). DoMiniTurn insert slides into the pocket like wedge, and this structure increases the clamping rigidity and tool stability, thereby preventing chatter and extending tool life.

Fig. 1



"DoMiniTurn series provides two types of clamping mechanisms: screw-on and side-clamping systems"

Both mechanisms do not interfere with chip evacuation. In case the access to the insert screw is limited due to machine configuration, the side-clamping system is often desirable as indexing can be operated from the front and back side of the toolholder. This function is useful for automatic lathes and Swiss-style machines with limited work space.

CASE STORY: AUTOMOTIVE INDUSTRY

Workpiece: Shaft in automotive component (Fig. 2)

Material: Stainless steel
(ISO X5CrNi18-9, AISI S30400, JIS SUS304)

Competitor's tool: DCGT type insert

DoMiniTurn / External Line:

Toolholder: JSDJ2XR1212X07

Insert: DXGU070301ML-JSS AH725

Cutting condition:

$V_c = 110 - 150$ m/min / External turning

$V_c = 10 - 100$ m/min / Face turning

$f = 0.04$ mm/rev / External turning

$f = 0.05$ mm/rev / Face turning

$a_p = 0.4$ mm

Machine: Small-sized CNC lathe

Coolant: Wet

Result: Competitor: Trouble in chip control occurred. Vibration caused the sudden chipping and shortened insert tool life, resulting in 5,000 pieces per corner.

DoMiniTurn: Rigid clamping and low cutting force prevented vibration and high wear resistance prolonged tool life by 30%, resulting in 6,500 pieces per corner. Double-sided insert provided 2.6 times increase in the number of machined workpiece per insert: 26,000 pieces per insert.

Fig. 2



"Tungaloy's DoMiniTurn - External line series is an excellent choice for precision machining in order to increase the productivity and efficiency provided by economical double-sided inserts with sharp cutting edges"

TYPICAL PARTS:

