

Tungaloy Technical Articles **Tung**TECH

MillLine
TUNG^{ORCE}**FREC**
TUNGALOY

Accelerate your small-diameter milling applications

by Yosuke Yamada (Shoulder Milling Assistant Product Manager)



TUNG^{ORCE}**FREC**
TUNGALOY ACCELERATED MACHINING

In the last several years, indexable tools started to push out their old-fashioned counterparts and became the new standard for any sort of metalworking.

"These indexable endmills have fantastic versatility compared to solid carbides, not to mention never having to regrind the cutting edges, thereby eliminating the administrative and logistic costs involved."

Some customers had considered solid carbide tools to be stronger or to have higher productivity as the indexable insert tools often have lesser flutes or pockets. Another concern is the size of the screw for the small inserts which is difficult to handle and often had issues of breakages during machining.



TungTech "TungForce-Rec: Accelerate your small-diameter milling applications"

Member IMC Group
Tungaloy

FLEXIBILITY, STRENGTH, AND SPEED

TungForce-Rec, Tungaloy's latest end-milling cutter eliminates the concerns cited above. The unique insert positioning on the cutter body allows the insert to be wider than the current insert in the market, and the installation provides enhanced support under the insert from an extra-large back metal, further increasing tool rigidity. This new layout offers the possibility to position a higher number of inserts on the tool compared to other endmills in the market.

Insert stability is increased by the new insert with V-shaped bottom and improved clamping, which prevents insert from moving during machining. Flexibility, strength, and speed – all are achieved while the production costs are reduced.

"TungForce-Rec's cutting edge features a large positive rake angle to ensure smooth cutting. "

An obtuse-angled flank of the insert adds additional strength to the cutting edge and reduces chipping. A wide cross-section allows these inserts to utilize a large holding screw, preventing screw shearing or movement during production. With these innovations, indexable end-milling tools have never been easier to use.

These advantages help increase productivity as shown in the case story. Solid endmills with a higher number of flutes could not be used at high parameters as it counteracted to increase vibration in machining a slim and sleek workpiece, such as a guide shift.



CASE STORY: GENERAL ENGINEERING

Workpiece: Guide shift

Material: S45C, C45 (25HRc)

TungForce-Rec:

Cutter: EPAV06R012M12.0-03 ($\phi D_c=12\text{mm}$)

Insert: AVGT060304PBFR-MJ AH3135

Cutting conditions:

$V_c = 151 \text{ m/min}$ (492 sfm)

$f = 0.05 \text{ mm/rev}$ (0.02 ipr)

$V_f = 601 \text{ mm/min}$ (23.7 ipm)

$A_p = 3.2 \text{ mm}$ (0.126")

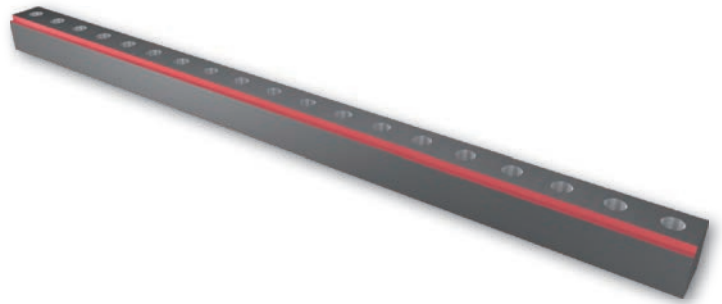
$A_e = 2.5 \text{ mm}$ (0.984")

Machine: VMC BT40 with coolant

Coolant: Wet (internal supply)

Result: TungForce-Rec improved productivity by 1.57 times compared with the current solid carbide endmill.

"The strong cutting edge and its design allow TungForce-Rec to machine a slim and low-rigid workpiece, such as a guide shift, with high productivity whereas solid carbide endmills with a higher number of flutes had vibration."



TYPICAL PARTS:

