



# CompoTech

Carbon Composite Components

## Composite Milling Machine Tools

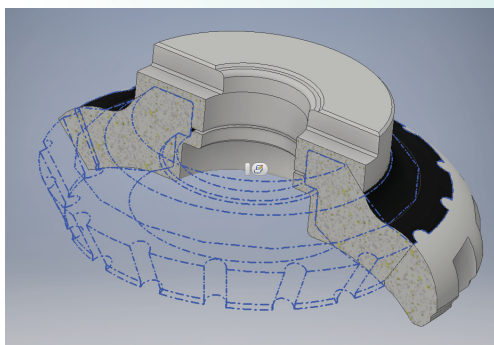
- Increased stability, accuracy and speed
- Reduced High frequency noise
- Better surface roughness
- Energy saving



Using Graphite Fibre Composite within a steel tool increases the natural frequency and introduces better damping. The enhanced damping properties and higher natural frequency reduce vibrations in the machining process, resulting in more stability, accuracy & speed.

Graphite Fibres have a negative coefficient of thermal expansion (CTE) and when made into a composite can be designed to have a zero CTE. A tool made with steel and a graphite fibre composite will have a CTE close to zero thus introducing the possibility of machining with no coolant.

Performance tests have shown faster more accurate machining and an improved surface roughness. This enables the possibility of one composite milling head doing the job of the two steel milling tools normally used for rough and final machining, and coolant may not be required.



**CFRP milling head D160** Comparison in milling process (in table) – the same conditions

| Parameters                                                                     | CFRP milling head D160<br>HOFMEISTER č.v.: H00664-01 | Tungaloy TAW13R160M40.OE16      |
|--------------------------------------------------------------------------------|------------------------------------------------------|---------------------------------|
| Weight                                                                         | 2,57kg                                               | 4,28kg                          |
| Flatness                                                                       | 0,0195mm                                             | 0,0246mm                        |
| Roughness Ra                                                                   | Lower than 1,6µm                                     | Lower than 1,6µm                |
| Spindle load during milling                                                    | 25%                                                  | 29%                             |
| Acoustic emissions (independent subjective assessment of the machine adjuster) | Lower frequency without whistling                    | Higher frequency with whistling |

# Innovation

Structure  
Composite  
Process



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## Composite Spindle Components

### Promising Research Results

CompoTech is working with machine tool producers and Universities on research for Spindle Components. The Main target is weight reduction and thermal stability of the spindle.



#### CFRP Shaft

Weight 4.2 Kg

Moment of Inertia  
 $3.6 \times 10^{-4} \text{ Kg m}^2$



#### Steel Shaft

Weight 14.7 Kg

Moment of Inertia  
 $11.9 \times 10^{-4} \text{ Kg m}^2$

#### CFRP Spindle shaft :

- 70% reduction in inertia
- 75% reduction in thermal displacement
- 16 times higher Damping
- 30% reduction in shaft expansion
- 2x Higher limit cutting depth