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Flexible Grinding Centre for Ultra-Productive 5-Axis  
Grinding of Aero Blades, Vanes, Segments & Medium Size  
IGT Components

## FGC 2 Flexible Grinding Centre

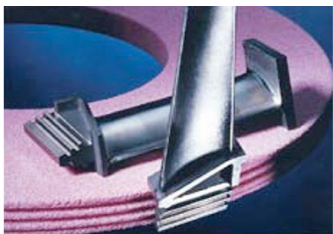
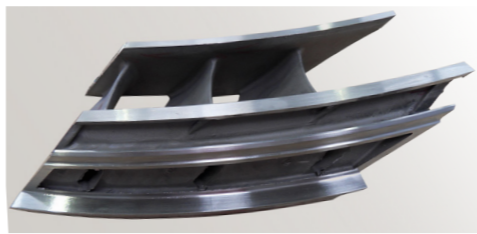
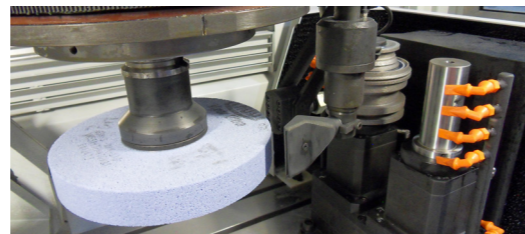


FGC 2

FGC 2



Winbro's FGC 2 delivers levels of productivity and profitability considerably greater than can be obtained from conventional creep-feed grinding machines.



The FGC 2, with its 4 and 5 axis capability allows complex components and forms to be manufactured simply and quickly. Performance benefits include reduced set up time, high part accuracy and fast cycle times.

#### Diamond Roll Wheel Dressing

The FGC 2 machine features both profiled diamond roll and rotary diameter disk dressing capability, providing quick and efficient set up. The machine can also be supplied with a double dresser capability for multiple and extended machining operations, providing even greater productivity levels. The dressing facility enables the economic and precise dressing of complex fir tree root forms and shroud end features - from initial profile dressing through to in-cycle wheel dressing.

#### High-Pressure / High Coolant Application

Coolant is supplied by a unique, fully programmable / steerable twin nozzle arrangement. This assures that coolant is continually supplied as near to the cut as possible and that the wheel is always clean and sharp. Results suggest a saving of 30% on wheel life compared to a standard, single nozzle type machine.

#### Coolant Filtration System

The FGC 2 grinding centre can be supplied with a unique media-free coolant filtration system. This system is both environmentally friendly, highly efficient and helps reduce operational and overhead costs. This media-free option totally eliminates filter paper consumption.

#### Automatic Wheel Change

We understand the need to maximise productivity in a high pressure manufacturing environment. The FGC 2 machine therefore has an automatic wheel change capability which keeps productivity high and wheel change related downtime low.

#### Unique Grinding Software

Easy to use, operator friendly and simple to program 3,4 and even 5 axis simultaneous machining of components using on screen graphics. This also includes the positioning of the programmable twin coolant nozzle system.

#### Applications in the Aero and Medium Sized IGT Industries

- Turbine Blades - Shrouded and Shroudless
- Compressor Blades
- Nozzle Guide Vanes
- Heat Shields

#### Machine Specification

##### Axis Travel

X Axis	800mm (31.4 inches)
Y Axis	600mm (23.6 inches)
Z Axis	510mm (20.0 inches)
A Axis (rotary)	360°
B Axis (tilt)	+/-110°

##### Feedrate

Rapid Traverse (X,Y and Z axes)	32m/min (1,260ipm)
Acceleration (X,Y and Z axes)	5m/sec <sup>2</sup> (196 in/sec <sup>2</sup> )

##### Accuracy - ISO 230-2

Positioning (X,Y and Z axes)	A 0.005mm (0.00019")
Repeatability (X,Y and Z axes)	R 0.003mm (0.00012")

##### Table

Working Surface	1400 x 650mm (55.0 x 25.5")
Slots	7 on 100mm centres (3.937")

##### Spindle

Maximum Speed	8,000 rpm
Motor HP Rating (S6-60%)	50hp / 38kW
Spindle Taper	BBT40

##### Control

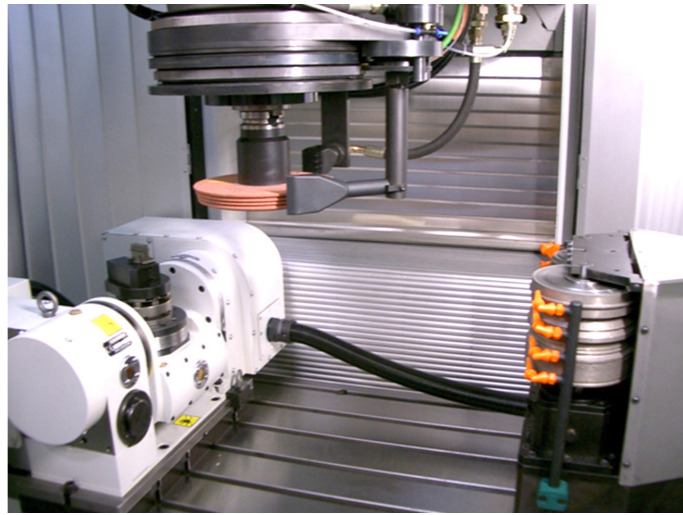
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##### Automatic Tool Changer (ATC)

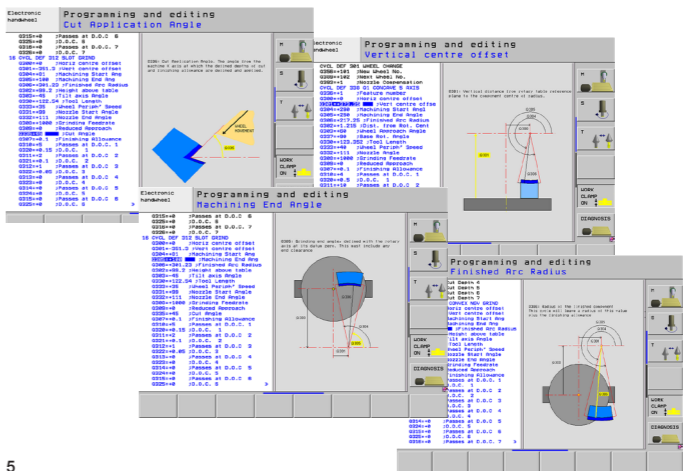
Type of Tool Shank	BT40 Supplied
Tool Storage Capacity	12 x 250mm (10") dia Wheels
	16 x 220mm (8.6") dia Wheels
Maximum Tool Diameter (milling)	75mm (2.5 inches)
Maximum Tool Diameter (grinding)	250mm (9.8 inches)
Maximum Tool Length (milling)	300mm (11.8 inches)
Maximum Tool Weight	7.0 kg (15.6lbs)
Maximum Weight (all tools)	200 kg (529lbs)
Random Change Time	
Tool to Tool	3.5 seconds
Chip to Chip	8.0 seconds

##### Coolant and Chip Management

Pressure	
Grinding	40 bar (580 psi)
Wheel Cleaning	70 bar (1,015 psi)
Coolant Flow	
Grinding	120l / min (31.7 gal/min)
Wheel Cleaning	100l / min (26.4 gal/min)



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1. Grinding wheel with twin coolant nozzles
2. Grinding of a Nozzle Guide Vane
3. Grinding Fir Tree Root Forms
4. FGC 2 with rotary tilt and stacked diamond rolls
5. Unique Grinding Software
6. FGC 2 machine