VIPER ULTRA

THE NEW FORMULA VIPER

- Greatly increased profile retention
- Minimized burn risk
- Increased number of components per wheel
- Reduced grinding time

TYROLIT

A Company within the SWAROVSKI Group

VIPER ULTRA

The patented VIPER system, developed in a TYROLIT joint venture, excels with its completely new and revolutionary approach to grinding operations for turbine rotor blades and nozzle guide vanes (NGV).

TYROLIT has succeeded in further advancing its special grinding wheels for this specific process and come up with its new generation of **VIPER ULTRA**.

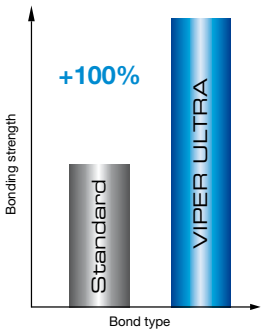
The development of the new, patented VIPER ULTRA matrix, as well as the sintering process enables a controlled wetting and coating of the grain surface, thereby providing the basis for significantly improved bonding of the grain.

The new **VIPER ULTRA** bond system is capable of absorbing exceptionally high dynamic loads without damaging the bond bridges; resulting in optimal use of the abrasive grain.

The matrix in conventional high-porous bond systems yields and is broken up under the influence of high infeed rates as a result of the alternating high frequency forces.

Not so with the **VIPER ULTRA** bond system which has the following benefits:

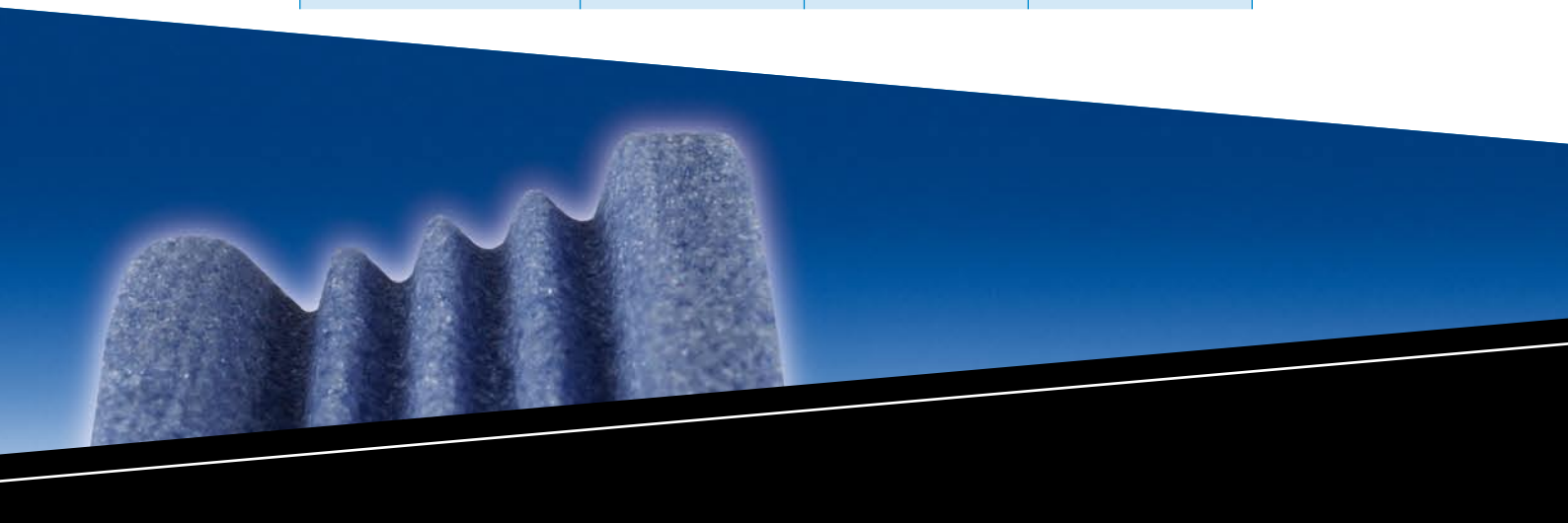
- cool cutting (minimized burn risk)
- excellent form holding and profile retention
- reduced dressing cycles and therefore higher lifetime of the roller dresser
- lower grinding forces
- lower process costs
- increased productivity/profitability



Direct comparison of the bonding strength of the grain in the new and conventional systems

Dimensions available

	MAKINO iGrinder G5 BRIDGEPORT FGC1	BRIDGEPORT FGC2	MAKINO A99
max. diameter	**220 mm**	**250 mm**	**300 mm**
width	**10 - 45 mm**	**10 - 45 mm**	**10 - 50 mm**
bore	**32 mm**	**32 mm**	**32/60 mm**



VIPER DIAMOND ROLLER DRESSERS
THE COMPLETE SYSTEM SOLUTION FROM TYROLIT

Dressing is of great importance to the grinding strategy as a whole. TYROLIT has allocated this role to the high precision **VIPER** diamond roller dressers.

Whether for CD or NON CD application: the key to success lies in the fine adjustment of the roller dresser and grinding wheel to the **VIPER ULTRA** system.

Based on our new manufacturing process TYROLIT has achieved optimum utilization of the diamond and therefore maximum roller dresser lifetimes.

For the production of the roller dresser you may either provide us with a final drawing of your requirements or our design team will do this according to your component drawings.

VIPER ULTRA application engineering

To tap the full potential of your **VIPER** machine TYROLIT offers you the support of its expert application engineers.
Know-how built on years of experience in process technology can help you to optimize your grinding process.

Whole-system analysis is concerned with the

- grinding strategy
- dressing strategy
- nozzle position and pressures
- workpiece holding

Multi-profile
dressing wheel

Single profile
dressing wheel

SUCCESS STORIES

Rotor blade - dove tail

End customer	**Aerospace industry**
Material	**Ni-Basis**
Machine	**Makino iGrinder G5**
Dressing	**non CD**
Operations	**2 operations/component**
Peripheral speed	**40 m/s**
Table speed	**2000 mm/min**
Cooling lubricant	**Emulsion**
Dressing amount	**0,4 mm**
Infeed	**0,1 - 2,0 mm depending on the process step**
Grinding wheel	**VU33A60II10VB01 VIPER ULTRA**
Components/wheel TYROLIT	**260**
Dimensions	**245x25x32**
Results	• **35 % increase in capacity** • **Increase in the number of workpieces per wheel from 200 to 260 (equivalent to 30 %)** • **Process costs savings of € 42.000,- with 35.000 components/a**
Measures	• **Optimization of the grinding and dressing parameters** • **Application of VIPER ULTRA**

SUCCESS STORIES

Rotor blade - fir tree profile

End customer	**Aerospace industry**
Material	**Ni-Basis**
Machine	**Bridgeport FGC 2**
Dressing	**non CD**
Operations	**4 operations/component**
Peripheral speed	**40 m/s**
Table speed	**1500 mm/min**
Cooling lubricant	**Emulsion**
Dressing amount	**0,4 mm**
Infeed	**0,1 - 1,5 mm depending on the process step**
Grinding wheel	**VU33A60II10VB01**
Components/wheel TYROLIT	**250**
Dimensions	**250x25x32**
Results	**•30% increase in capacity** **• Increase in the number of workpieces per wheel from 150 to 250 (equivalent to 67 %)** **• Process costs savings of € 20.000,– with 20.000 components/a**
Measures	**• Optimization of the grinding and dressing parameters** **• Application of VIPER ULTRA**

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T5309-M-1-GB01-0807-Athesia