

Metkon Application Note

SAMPLE : Super Alloys used in Turbine Blades

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Ti alloys are mostly used in compressor parts. They have low specific weight, low temperature capacity Ti 6 Al V 4 (Ti64) are used in motor and airplane skeleton applications.

Ti64 have great strength, super mechanical machinability and weldability properties in low temperatures.



APPLICATION REQUIREMENTS



SERVOCUT 301 offers the advantage of combining different cutting techniques and methods into the same machine to obtain superior cut surfaces for a broad range of heavy duty cutting applications.

SERVOCUT 301 has X-Y-Z triple axes cutting capability:

Z-axis Chop cutting: The specimen is clamped and the cut-off wheel approaches the specimen.

Y-axis Table-feed cutting: Feeding the clamped specimen into a rotating cut-off wheel using a T-slotted feed table.

X-axis Parallel Cutting (optional): Parallel serial sectioning in the x-axis with optional movable x-bed.



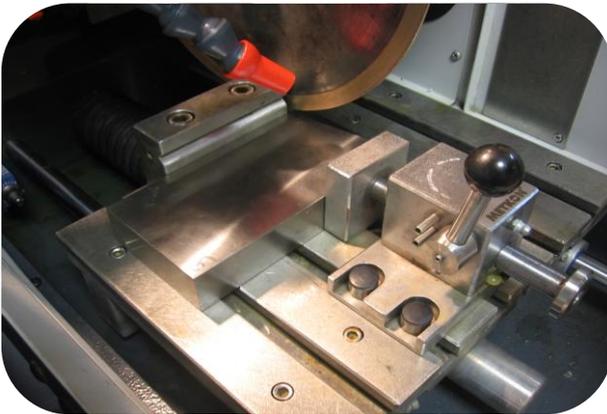
ECOPRESS 100 is an easy to use automatic mounting press. It has advanced software with programmable HMI touch screen controls. Robust bayonet closure allows for quick and safe operation. ECOPRESS offers a wide selection of mould assemblies from 25 to 50 mm in diameter. Two mounts can be produced simultaneously with the use of an intermediate ram. The pressure, heating and cooling are automatically controlled and the total cycle time of a complete cool mount takes 8 to 10 minutes. The parameters can be changed and adjusted during the mounting process.



DIGIPREP 251/301 is designed for fully automated materialographic sample preparation for consistent and reproducible specimen quality. DIGIPREP's Automatic Head controls the force applied precisely and specimens are prepared exactly the same way everytime, independent of operator skills. With the ability to store and recall preparation programs on the LCD screen, same consistent results are obtained. Efficiency is further increased by adding DOSIMAT Peristaltic Dispensing Unit for automation and control of consumable consumption.

SAMPLE PREPARATION PROCESSES

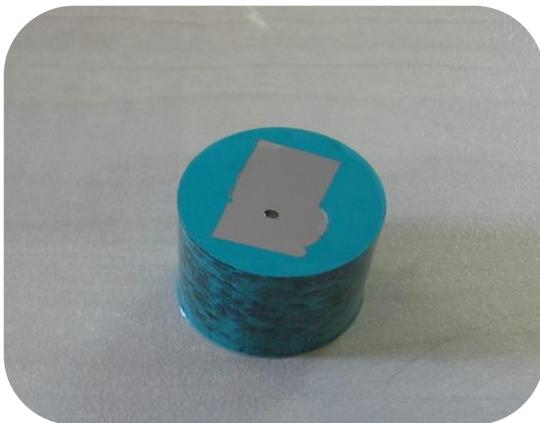
SECTIONING



Equipment: Servocut 301 - AA
Clamping Device: GR 0013
Cutting Fluid: Metcool
Order No: 19-902
Cut off Wheel: Diamond Cutting Disc
Order No: 19-300

Description : The sample is attached with quick acting clamping device to Servocut 301 - AA. And the feed rate should be set as 250 rpm.

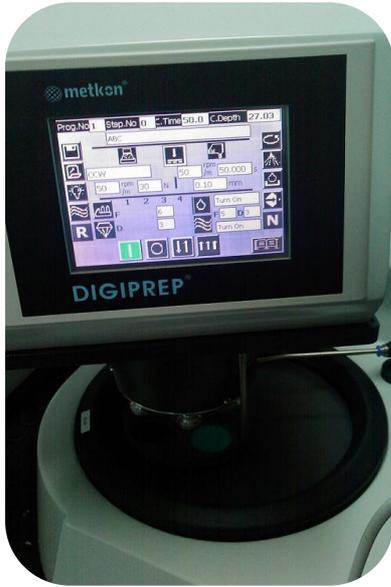
MOUNTING



Equipment: Ecopress 100
Mould Assembly Dia.: 40 mm
Mould Release Spray
Order Code : 29-099
Mounting Powder: DAP
Order Code: 29-012

Description: By using DAP Mounting Powder the temperature is set to 190 °C and the pressure is set to 250 bar. After 5 min. curing time the mounted sample obtained is as on the left.

GRINDING & POLISHING



Equipment: DIGIPREP 251

Disc Dia.: 250 mm

4 x 40 mm. Sample Holder

Order Code: 45 13

Description: After every step of grinding, the sample has to be cleaned with water . In polishing step the force applied and the disk speed is lowered.

Preparation Method

Parameter Stage	Surface	Abrasive	Lubricant	Force per	Time	Disc Speed	Relative
				Sample, N	min.	rpm	Rotation
Planar Grinding	Magneto	54 Microns	water	25	2	300	Contra
	38-040-054	Diamond					
MP 1. Step	Magneto	18 Microns	water	25	3	300	Contra
	38-040-018	Diamond					
MP 2. Step	Fedo 3	39-420 -P	Diamond suspension & Diamond Lubricant	20	4	250	Contra
	39-025-250	39-502					

Etching: 92 ml pure water , 6 ml Nitric Acid , 2 ml Hidrofloric Acid

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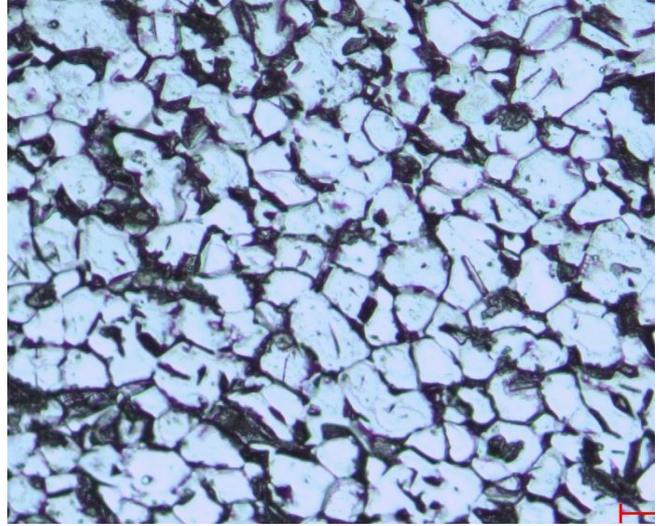
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After etching the photo of microstructure is as on the right side.

The black areas are Vanadium where named as beta



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