SYNOVA	**SYNOVA SA** **Document Category** Protocole	**Application Track Sheet**	**Lang.:** English **Version**: 0.7 **Status:** Released

Customer	Anonymous
Sample n°	
Iteration n°	1
Report n°	133-2
Application engineer	ACH
Date	2013-03-23

Sample description

Materials	Copper
Thickness / dimensions	250 µm
Final application	Trim the tie bars in copper lead-frame

Test Parameters

Machine	LDS 300M	Serial	0149		
Laser type	L51G	Serial	121019		
Fiber diameter [µm]	150				
Collimation lens [mm]	200				
Aperture diameter [mm]	-				
Aperture position [mm]	-				
Assist gas (He or/and Air)	He	Flow rate [l/min]	0.8		
Nozzle diameter [µm]	80				
Nozzle type	Sapphire				
Splashguard	No				
Diaphragm	No				
Pressure [bar]	480				
Coherence length [mm]	~30				
Working distance [mm] (head to sample)	10				
Repetition rate [kHz]	17				
Current [A] or [%] / Attenuation	100				
Pulse length [ns]	398.8				
Pulse delay [ns]	4us				
SHG temp [°C]	32.9				
Average power [W]	52				
Power in water jet [W]	30.4				
Dist. head-powermeter (mm)	20				
Speed [mm/s]	100				
No of passes	25				
Processing time	13sec				
Linear Acceleration [mm/s²]	100				
I5178 (radial Acc) [mm/s²]					
I5187 [mm/s²]					
I5188 [mm/s²]					
NC programs Folder path					
NC programs name(s)					
Sample fixation	JIG				

Results

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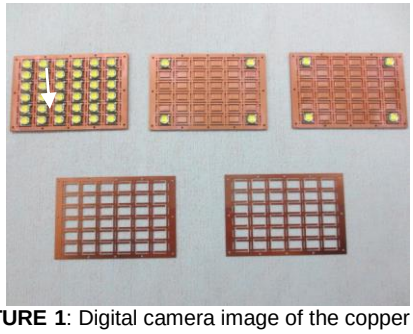
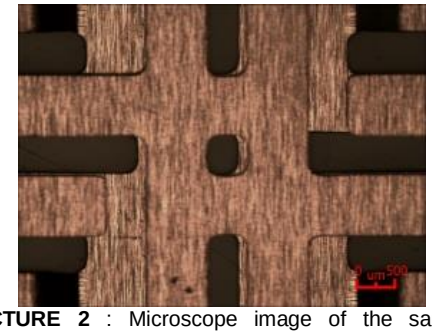
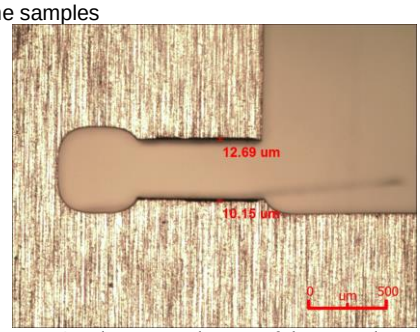
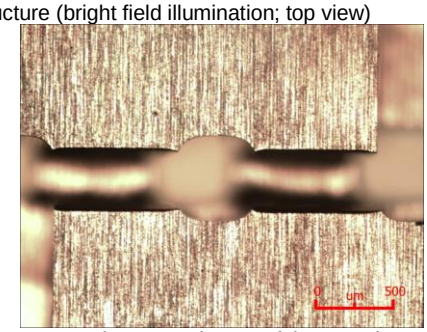
Overall quality obtained	 **PICTURE 1**: Digital camera image of the copper lead-frame samples  **PICTURE 2** : Microscope image of the sample structure (bright field illumination; top view)  **PICTURE 3**: Microscope image of the sample (bright field illumination; top view)  **PICTURE 4** Microscope image of the sample (bright field illumination; top view)
Number of days (hours) spent	3
Chipping size (width, length etc) (um)	No Chipping
Burrs width (um)	Less than 20um
Heat affected zone location and width (um)	Do not have
Possible improvements	N/A

Engineering

Splashguard	No
Diaphragm	YES
Cooled head	No
Wetting film device	Yes
Z axis	Yes
Corrosive materials	No
Toxic material	No
Sample special lighting needed	No
Automatic alignment needed	Yes
Waterjet shutter needed	No
Cleaning station	Yes
Special sample air blowing	Yes
Horizontal head	No
Laser supplier recommended	Lee green >100W or IPG 100W
Pump supplier recommended	-

Predicted Machine customization (describe the possible customization)	-
List all previous report numbers	-
List all drawing names	

For Potential PIF

Predicted Application tests for pre-acceptance and final acceptance

Material	
Sample dimension and Thickness	
Sample geometry description	
Number of samples to be tested	
Summary of Application	
Test description	
Measurement to be performed	

Criteria for pre-acceptance and final acceptance

Process time	
Kerf	
Edge quality	
Cutting accuracy	
Etc…	