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Premstaetten, July 16, 2018

Product Change Notification PCN23-2018

Exchange of Pretreatment Chemistry to a cyanide free zincation and improvement of aluminum etch

Dear Customer,

Please be informed that amsAG plans to have process change for pre-treatment chemistry from **cyanide zincation** to **cyanide free zincation** on all ams AG TSV product for bumping at Pactech.

As a benefit, the zincation step is in future cyanide free. This process change will help to substitute a dangerous part of the chemical to non-dangerous chemical. With this it will also helps to achieve smoother pad surfaces after Ni/Au or Ni/Pd/Au plating.

This Process change was introduced by Pactech in 2016 and was fully qualified on ams AG TSV product.

Affected product(s):

<u>material ID</u>	<u>description</u>
191730019	TSL2584TSVM CSP LF T&R
191730027	TSL2584TSV CSP LF T&R



Comparison between old (cyanide zincation) and new chemistry (cyanide free zincation) recipe on ams TSV products.

Recipe / Description	Oxide Etch [s]	Zincation Type	Zincation 1 [sec]	HNO3 [sec]	Zincation2 [sec]
Standard Recipe	2.0version 90 sec	Cyanide	5	20	15
New Chemistry	3.0version 30 sec	Cyanide Free	5	15	20

Advantages:

- More homogenous zincate layer with reduced grain size
- Smoother Nickel deposition and better yield
- Comparable or less aluminum Etching
- Improvement for pure aluminum and aluminium silicon pads
- Free of cyanides, reduced toxicity and easier waste treatment

Qualification and Reliability Results

Results will be provided upon request.

Impact on Product

- a. No impact as there will be no change in terms of form, fit and function of the devices.

Product Traceability

New recipe will be recorded at Pactech system on each ams product that will be fully released and implemented in production.



Target Date of Implementation: end Q3 2018 or upon customer approval.
Upon customer approval, ams AG will define a cut-off period.

Please be advised that unless we received your written refusal concerning this PCN in writing within 30 days, the PCN shall be deemed accepted.

If you do have further questions, please do not hesitate to contact me.

Best Regards,

A handwritten signature in black ink, appearing to read 'Herwig Klimesch'.

Herwig Klimesch
ams AG
VP Quality