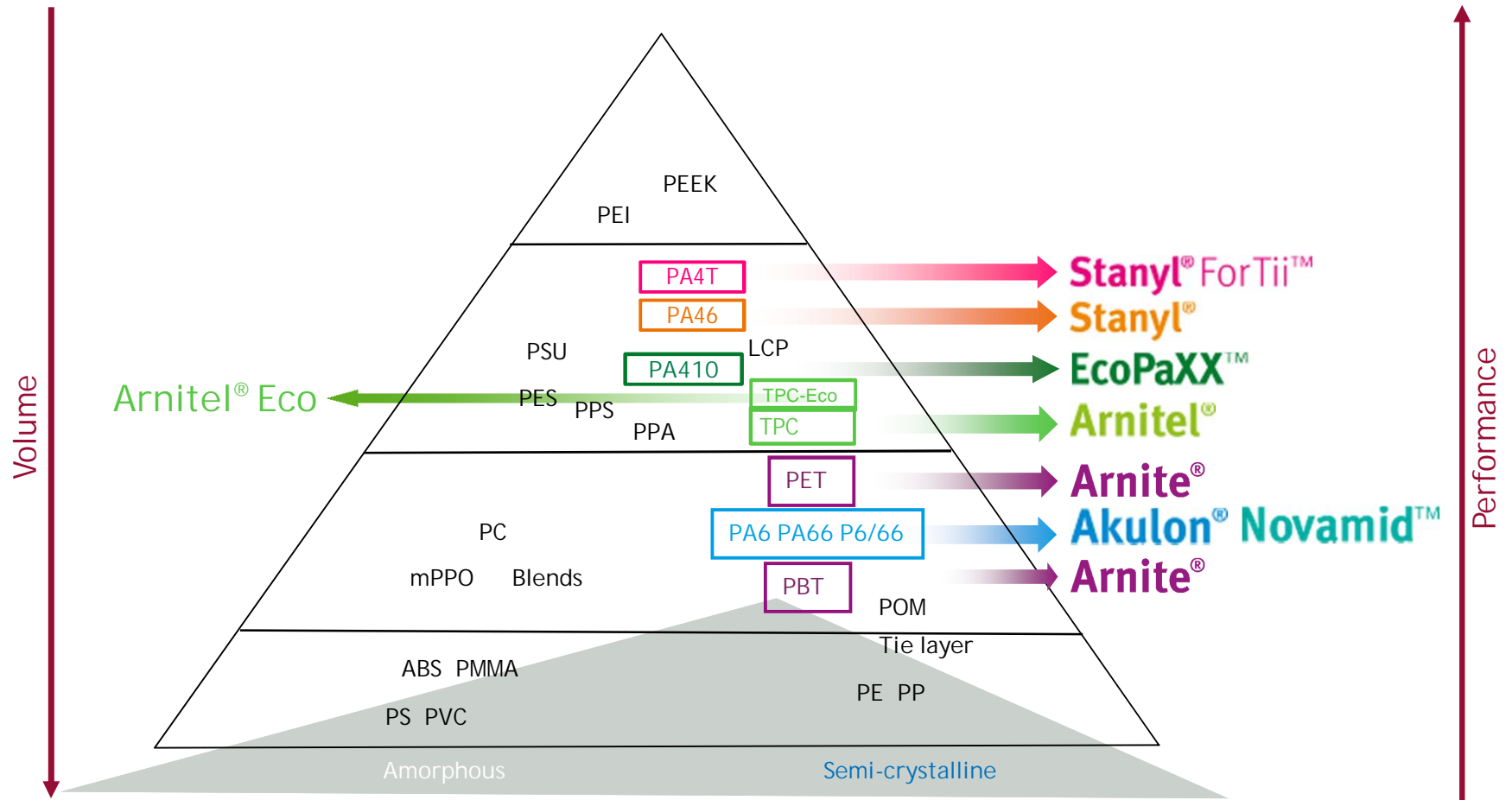


Stanyl ForTii LDS For Integrated Electronics

DSM Engineering Plastics
May 2015

DSM product portfolio

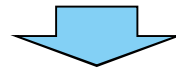
- PA4T extends range of high performance thermoplastics -



Trends in electronics

- Miniaturization and “thinnovation” demand for increased integration in consumer electronics
- Growing integration of electronics in automotive
- Increasing demand for Design freedom. (Style & function)

All leading to the increase need for 3D MID technology



Normal plastic component



1. Injection molding



2. Finished parts for assembly

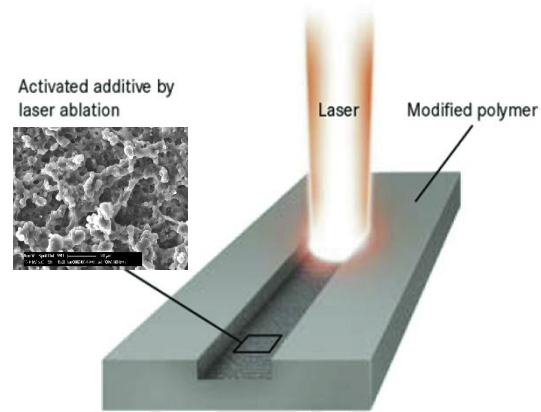
A “straight forward” molding process already involve many aspects which need attention.

- Part design
- Mould design
- Equipment choice
- Process setting
- ...

LDS component production



1. Injection molding



2. Laser Structuring



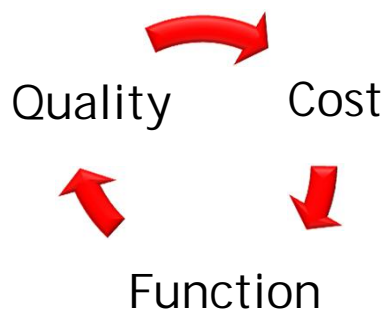
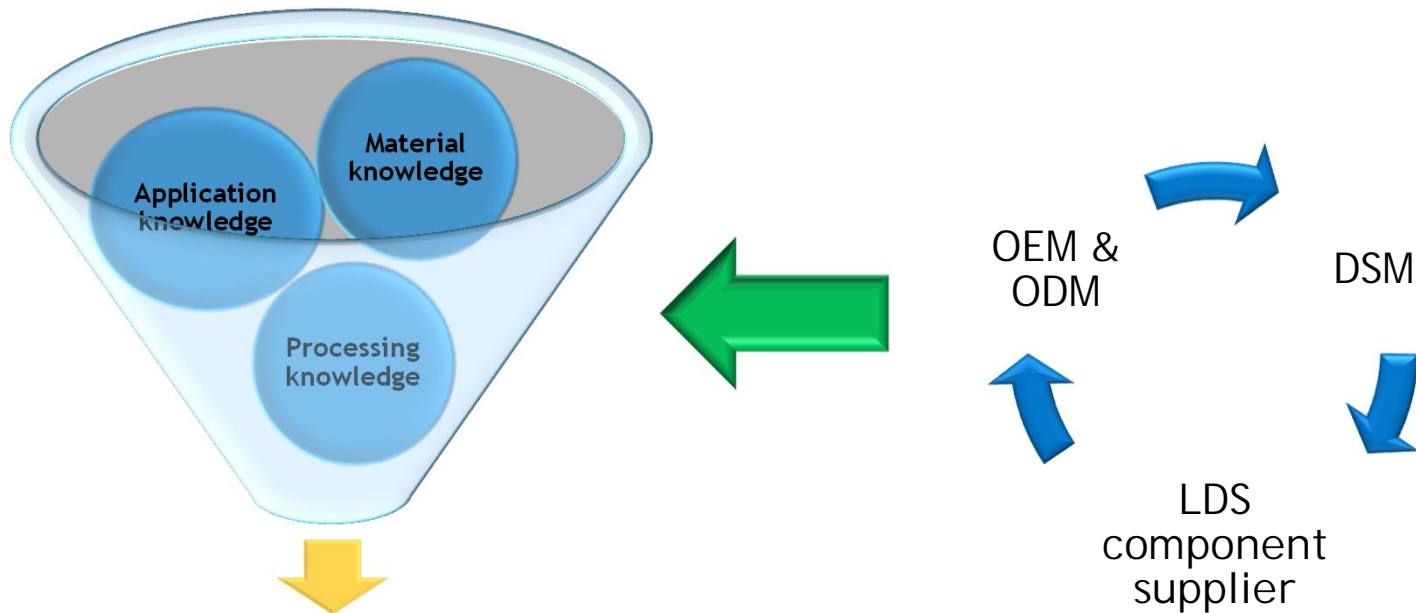
3. Plating.



4. Finished parts for assembly

Much more complicated processing step bring challenges in manufacture of high quality components, and increase the complexity of trouble shooting.

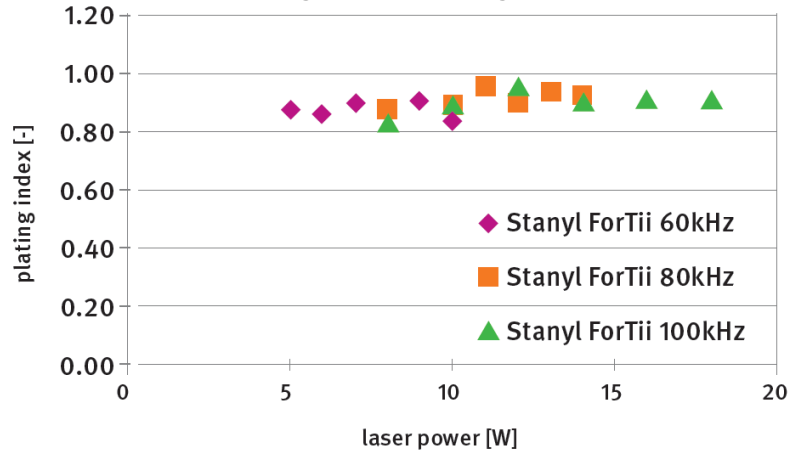
Working closely together



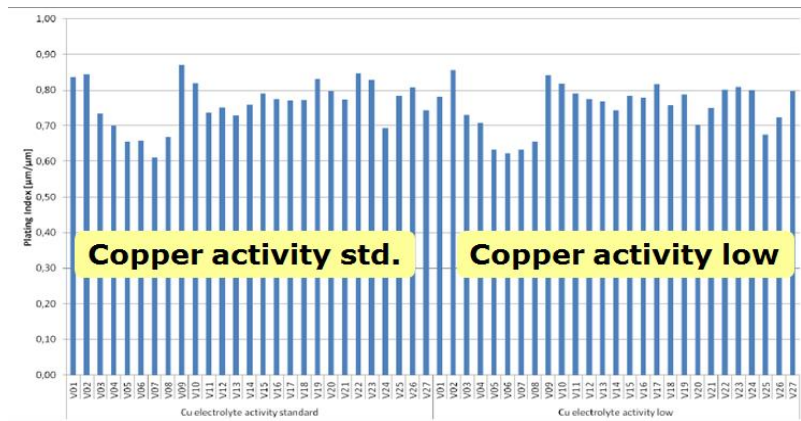
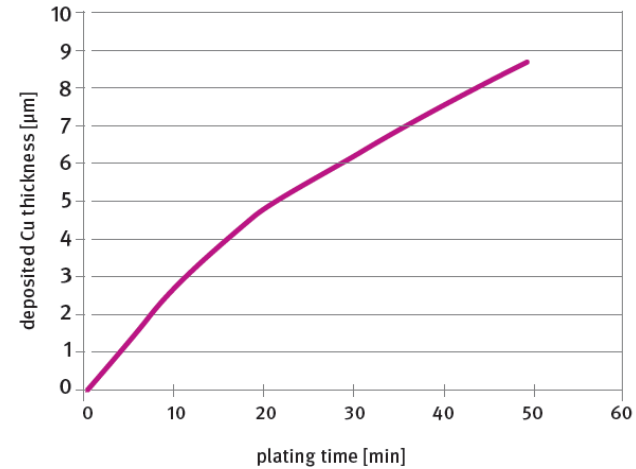
- Material performance and possibilities
- End application requirements
- Mechanical design
- Electronics design
- Mould design with LDS consideration
- Laser structuring competence
- Plating chemistry

Cost & Quality - robust plating performance

High plating index



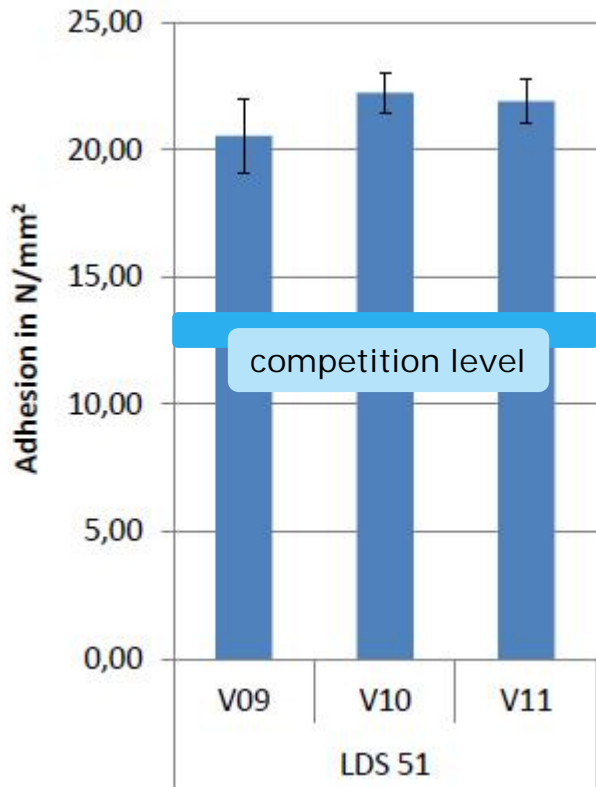
Fast copper initiation



Power: 2-8 w & speed: 2m/s & 4 m/s

- Fast lasering
- Fast Plating
- Quality assurance
- Stable process

Quality & function - superior adhesion

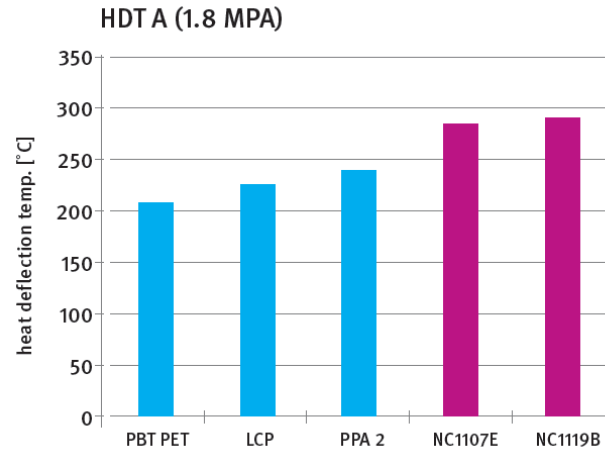


*Test is done by HSG-IMAT with pull test methods

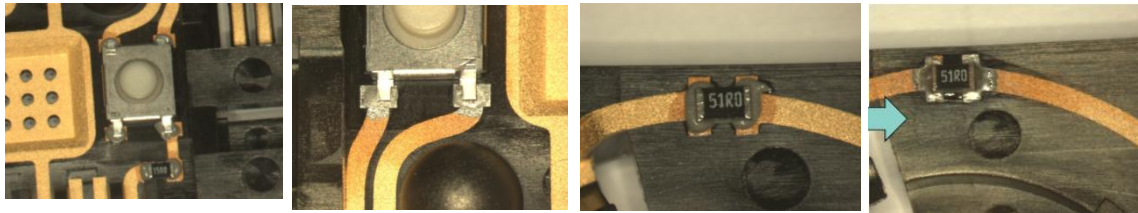
- Stanyl ForTii grades are already used in consumer electronics applications, industrial applications, and automotive applications.
- Superior adhesion ensures the integrity of the designed 3D circuitry under various conditions defined by assembly process and end use environment.

- Reflow process (>260 °C)
- Temperature cycling
- Temperature humidity cycling
- Vibration
- Mechanical load
-

Function & cost - Stanyl ForTii LDS as 3D PCB substrate



Trade name	Stanyl ForTii	Stanyl ForTii	Stanyl ForTii
Color	Nat Blk	Nat Blk	Nat Blk
TM (GPa)	12	10.5	11.2
TS (MPa)	130	150	120
EaB (%)	1.2	2	1.6
Notched charpy (kJ/m2)	2	4.2	
UL94 performance bar 0.8 mm	HB	HB	V0
HDTA (1.8MPa) (°C)	300	285	290

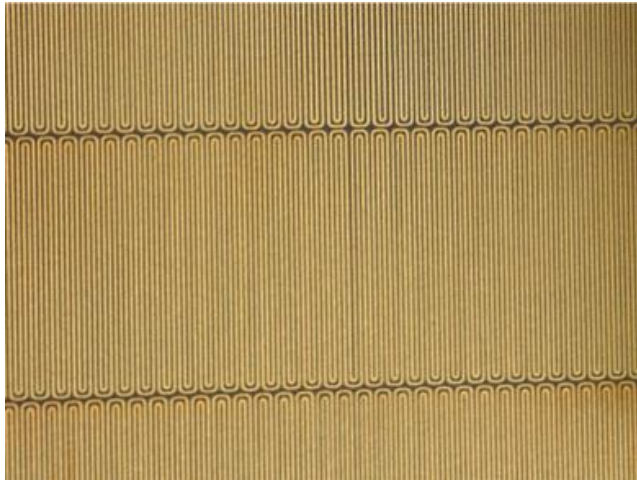


- Truly reflow compatible
 - Structure integrity at reflow temperature
 - Robust plating under thermal shock
- Capable of mechanical function integration

- Sensors
- Camera modules
- Lighting substrate
- User interface
-

Improved performance

- fine line capability

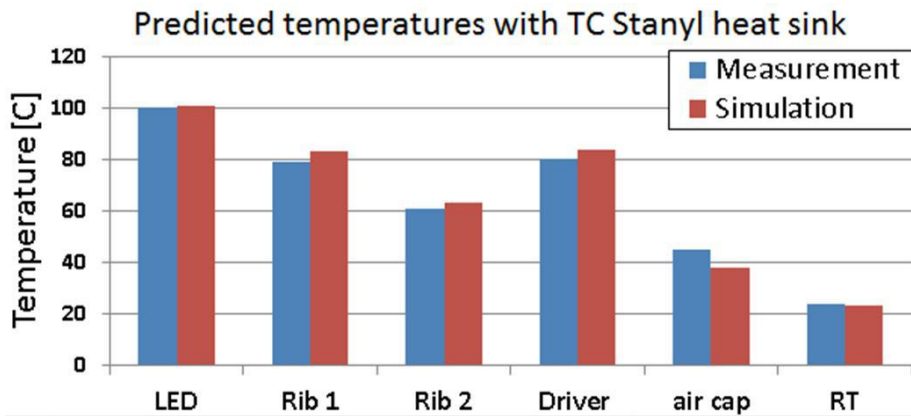
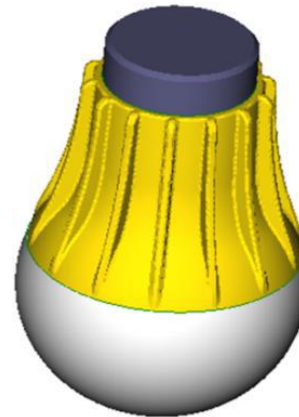
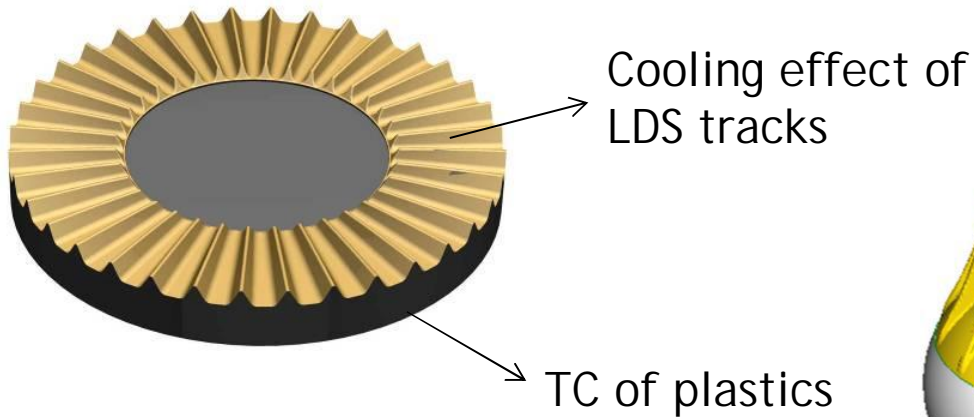


80 micron line width and 80 micron line gap has been achieved in production environment with Stanyl ForTii LDS material.

Combination of material, molding and LDS processing achieved this high standard.

multiple dimensions
3D-MID Technology

Integration of heat management



DSM is highly competent in heat management, and can be your best partner on this type of applications.

DSM approach in LDS development

- Understanding of the industry and the value chain
- Strong application and market knowledge
- Strong application support & early involvement in projects
- Working closely together with our partners.





BRIGHT SCIENCE. BRIGHTER LIVING.™

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