

CHEMISTRY THAT MATTERS™



# LNP THERMOTUF NMT SOLUTION

March 2020



## LNP™ THERMOTUF™ WF006NIQ INTRODUCTION

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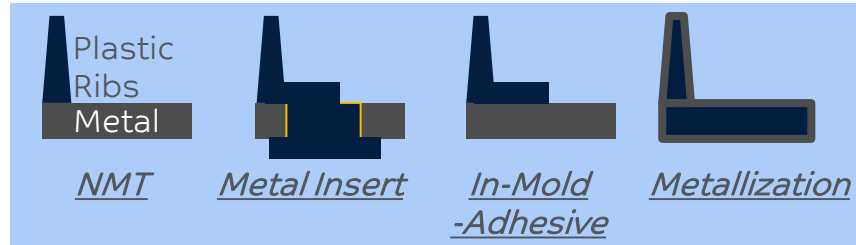
LNP THERMOTUF WF006NIQ is a 30% glass fiber reinforced PBT compound with 25% PCR content, used for NMT applications requiring sustainability concept.

### Value Proposition:

- 25% PCR content
- Comparable properties as virgin WF006N
- Good warpage control
- Good color-stability

## NMT SOLUTION BASIC INTRODUCTION

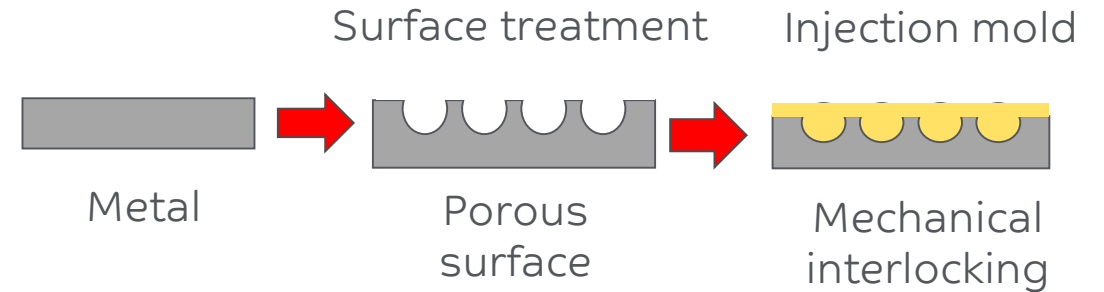
### Types of Metal/Plastic Hybrid Design



### What is NMT?

Nano molding technology (NMT) is an innovative technology wherein plastic resin is injected into metal surface which has been treated by the special chemical solution. This process is developed from the integration technology of metal and plastic, It is an excellent way to make key parts of consumer product and replace the traditional insert molding or die casting process.

### Bonding Mechanism

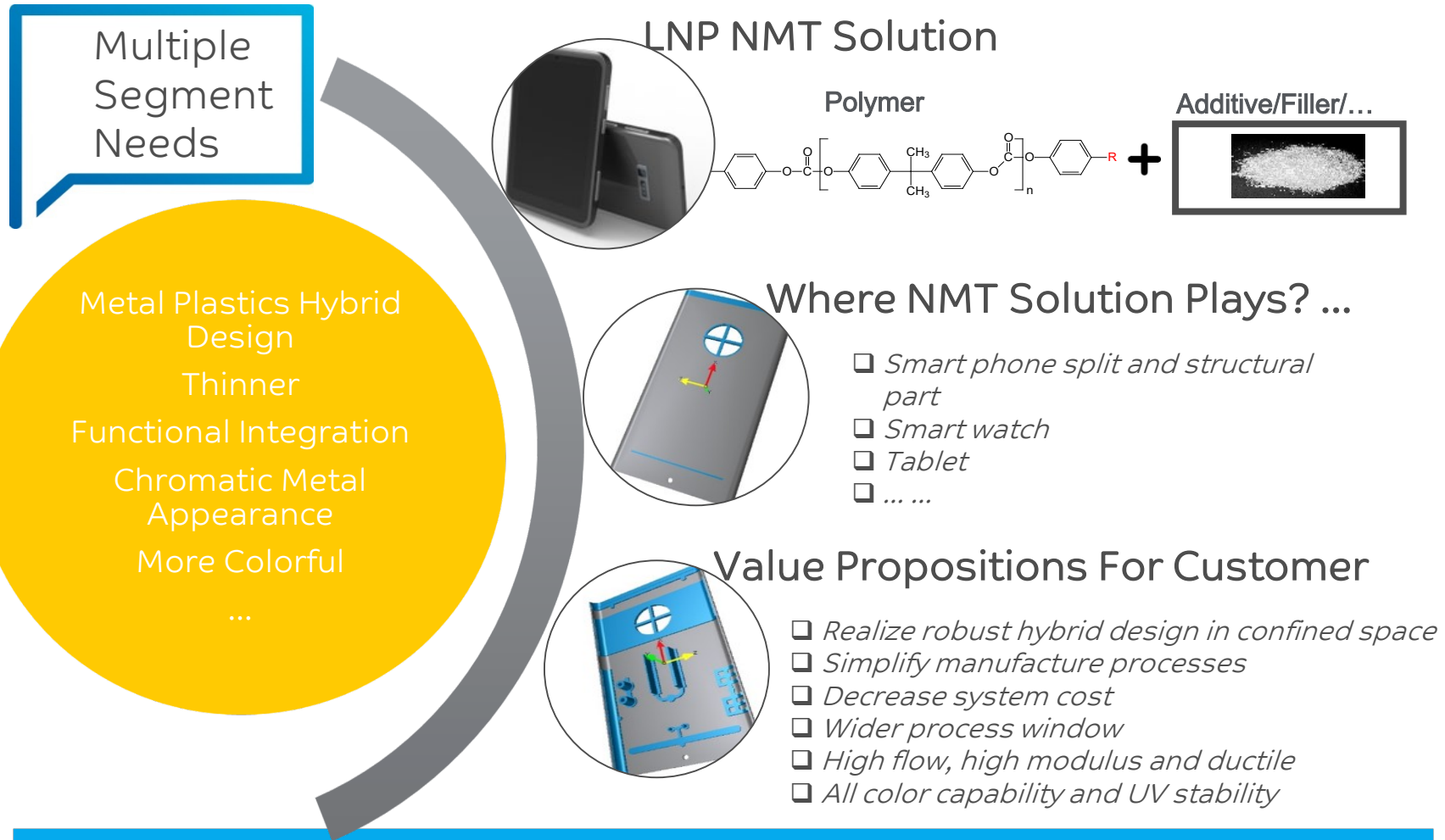


### Potential Benefit

- Reduce product thickness and weight
- Excellent mechanical structure
- Achieve multi-functionalities
- Bonding strength reliability vs. glue adhesion
- Variety of surface decoration process alternatives



# LNP™ NMT SOLUTION INTRODUCTION



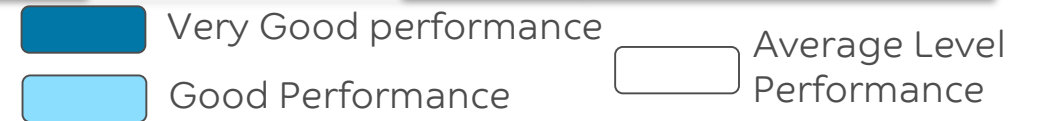
**LNP NMT Solutions Can Help Improve Smart Phone Hybrid Designs**

## LNP™ NMT PRODUCT PORTFOLIO (THERMOTUF™ RESIN)

		Bonding Force	Dk / Df@1.9GHz	NII @23°C, J/m	Flexural Modulus (MPa)	Key Feature	
LNP NMT PORTFOLIO	Normal Dk	WF006N	~30MPa (T) ~33MPa (TRI)	3.54/0.012 (BK)	165	6600	Excellent impact, good warpage control
		WF006NIQ	~30MPa (T) ~33MPa (TRI)	3.62/0.012 (BK)	137	7700	25% PCR, good color-stability and warpage control,
		WF008N	~32MPa (T) ~37MPa (TRI)	3.74/0.011 (BK)	143	10300	High modulus, good bonding force and color stability
		WF008NA	~40 Mpa (TRI)	3.99/0.01 (BK)	151	11956	High modulus, good impact & bonding force & warpage control & color stability
		WF008NXQ	~40 Mpa (TRI)	3.8/0.0097 (BK)	130	11000	Very high adhesive strength with glass screen, high modulus, very high bonding force
		WF009NA	~42 Mpa (TRI)	4.01/0.008	120	13400	Very high modulus, good warpage control, very high bonding force (TRI)
	WF009NAR	~42 Mpa (TRI)	3.92/0.009	100	13700	Very high modulus, good surface, very high bonding force (TRI)	
LowDk	WF004N	~28MPa (T) ~35MPa (TRI)	2.95/0.009	120	5300	Very low Dk (<=3.0)	

# LNP™ THERMOTUF™ NMT PORTFOLIO VALUE PROPOSITION

	Low Warpage	High Impact	Color-Stability	High Modulus	Low Dk/Df	High Bonding Force	PCR	High Adhesive Strength with Glass Screen
WF006N	Very Good performance	Very Good performance	Very Good performance	Average Level Performance	Good Performance	Average Level Performance	Average Level Performance	Average Level Performance
<b>WF006NIQ</b>	Very Good performance	Very Good performance	Very Good performance	Average Level Performance	Good Performance	Average Level Performance	Very Good performance	Average Level Performance
WF008N	Average Level Performance	Good Performance	Very Good performance	Good Performance	Average Level Performance	Good Performance	Average Level Performance	Average Level Performance
WF008NA	Very Good performance	Good Performance	Very Good performance	Good Performance	Average Level Performance	Good Performance	Average Level Performance	Average Level Performance
WF008NXQ	Very Good performance	Good Performance	Very Good performance	Good Performance	Average Level Performance	Good Performance	Average Level Performance	Very Good performance
WF009NA	Very Good performance	Average Level Performance	Very Good performance	Very Good performance	Average Level Performance	Very Good performance	Average Level Performance	Average Level Performance
WF009NAR	Average Level Performance	Average Level Performance	Very Good performance	Very Good performance	Average Level Performance	Very Good performance	Average Level Performance	Average Level Performance
WF004N	Average Level Performance	Average Level Performance	Very Good performance	Average Level Performance	Very Good performance	Average Level Performance	Average Level Performance	Average Level Performance





THANK YOU



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