MARFRAN .2K

OVERMOULDING

TPE COMPOUNDS
FOR 2K TECHNOLOGIES

MARFRAN

ELASTOMERS. WITH PASSION

MARFRAN® 2K GRADES OVERVIEW

GRADE	Hardness ShA	Food contact Grade	PP	PE	Styrenics (PS, SAN, ABS, ASA)	Polycarb. and PC blends (i.e. PC/ABS)	PBT TPE-E	PA6 PA66
MARFRAN® standard families	20 ÷ 95	YES	X					
MARFRAN® EHA	45 ÷ 95	YES		X				
MARFRAN® E C2	40 ÷ 90	YES			X	X	X	
MARFRAN® E A2	50 ÷ 90	NO			X	X	X	
MARFRAN® E A2F	50 ÷ 85	YES			X	X	X	
MARFRAN® E TPA1	40 ÷ 80	NO						X
MARFRAN® E TPA 3	55 ÷ 75	NO						X
MARFRAN.MED® ST, M, HTR	30 ÷ 90	USP VI	X					
MARFRAN.MED® A1	50 ÷ 70	USP VI			X	X	X	

PROCESSING SUGGESTIONS

Pre-drying is MANDATORY for materials intended for adhesion to polymers which themselves must be pre-dried: the material must be dried for 4 hours at 80°C before processing.

INJECTION MOULDING			
Adhesion on	PP and PE	Styrenics and PC	PA6 and PA66
Temperature profile of the barrel (°C)	190 ÷ 220	200 ÷ 260	220 ÷ 260
Maximum allowed processing temperature (°C)	240	270	270
Mould temperature (°C)	20 ÷ 30	30 ÷ 60	30 ÷ 60

- Injection moulding machine with standard general purposes three zone screw for polyolefinic polymers.
- Best result will be achieved using a two-shot injection moulding machine with rotating tool; insert moulding is anyway possible but it does not provide the same results as a two-shot process.
- Hot runners must be preferred over traditional sprues.
- Injection pressure/speed: medium/high.
- Rigid substrate pre-heating: strongly recommended to allow the best adhesion.
- Screw feeding delay recommended.

EXTRUSION		
	Adhesion on PP and PE	Adhesion on Styrenics and PC
Temperature profile of the barrel (°C)	170 ÷ 200	180 ÷ 220
Die temperature (°C)	180 ÷ 210	200 ÷ 230
Maximum allowed processing temperature (°C)	240	260

- Single screw extruder with standard three zones screw for polyolefinic polymers.
- L/D ratio ≥ 25.
- Screw compression ratio ≥ 2,5:1.

MOULD DESIGN TIPS

Given that the responsibility for the correct functioning of the mold is the sole responsibility of the designer, here below are some general suggestions that can be taken into consideration during the mold design phase. Marfan does not accept responsibility for the molds and/or the products made by converters.

DESIGN THE CONTACT SURFACE

Beyond the transformation conditions of the TPE that of the rigid substrate, the quality of the adhesion depends on the geometry of the contact area between the two materials.

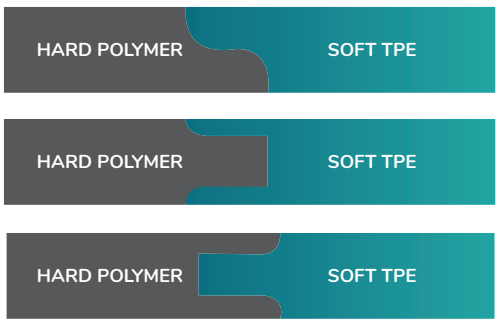
Criteria of the project:
- Maximize the contact area itself.
- Create, if possible, holes, grooves and/or undercuts in order to maximize the bonding between the two materials.
- Avoid thickness thinning areas of the TPE.

Here are some examples of layouts to avoid compared to other recommended ones.

Layout to avoid

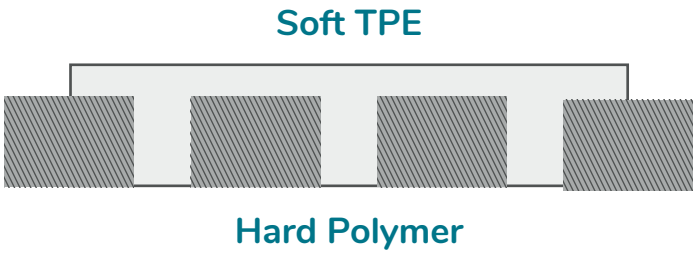
Limited contact area;
thickness thinning areas in the second example.

Better layouts



High contact surface;
no thinning area.

Layout for larger surfaces and reduced thicknesses



High contact surface with many mechanical couplings.

TOOL VENTS DESIGN

Particular attention should be paid to the positioning and sizing of the tool vents.
Incorrect design of the vents can lead to filling difficulties, material burns, unsatisfactory surface finish, loss of adhesion between the materials in the final parts of the filling.

PEELING TEST ACCORDING TO VDI 2019

To evaluate the degree of adhesion between two different materials, Marfan follows the VDI 2019 standard. This procedure involves the molding of a specimen on a bi-injection machine, the specimen is then tractionated to perform the peeling strength measurements. This procedure allows us to provide the customer with scientific data on which to base serious and reliable projects.

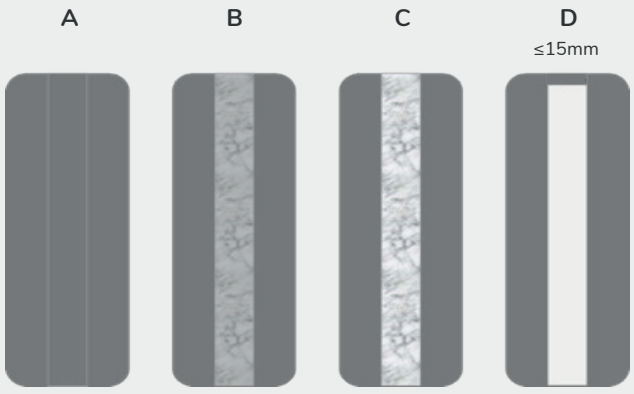
As part of the test, the soft component of the specimen is subjected to traction at a constant speed, at an interface angle of 90° until the joint between the two materials separates or the softer material breaks. The required force and distance traveled are processed by a dedicated machine set according to ISO 527-1.

SOME RESULTS ON OUR MATERIALS

MARFRAN® E C2 PEEL TEST according to VDI 2019									
	PC			ABS			PBT		
Grade	Peel Strength (N/mm)	detachment mode	T injection TPE (°C)	Peel Strength (N/mm)	detachment mode	T injection TPE (°C)	Peel Strength (N/mm)	detachment mode	T injection TPE (°C)
MARFRAN® E C2 40A	3,5÷4,0	B	200÷220						
MARFRAN® E C2 70A	6,0÷7,0	D	200÷220	3,5÷4,0	B	210÷230	4,5÷5,0	D	240
MARFRAN® E C2 80A	9,0÷10,0	D	200÷220	5,0÷6,0	B	210÷230			
MARFRAN® E C2 90A	9,5÷10,5	D	200÷220	5,0÷6,0	B	210÷230			

MARFRAN® E TPA1 and MARFRAN® E TPA3 PEEL TEST according to VDI 2019						
	PA66 (nucleated)			PA66 (with release agent)		
Grade	Peel Strength (N/mm)	detachment mode	T injection TPE (°C)	Peel Strength (N/mm)	detachment mode	T injection TPE (°C)
MARFRAN® E TPA1 65A	4,8	C	220	5,2	C	220
MARFRAN® E TPA3 55A	5,9	D	220	5	D	220
MARFRAN® E TPA3 75A	5,6	D	220	5,6	D	220

DETACHMENT MODE DESCRIPTION	*MODE*
NO TPE RESIDUE ON SUBSTRATE	A
1% TO 50% TPE RESIDUE ON SUBSTRATE, NO TPE BREAK	B
51% TO 99% TPE RESIDUE ON SUBSTRATE, NO TPE BREAK	C
TPE STRIP TEARS WITHIN 15MM OF PEELING PATH	D



The data provided in this documentation are based on laboratory test and on the best knowledge of the company at the revision date. Technical data may be modified based on new tests and / or knowledge available. All the information has provided to give a technical description of the product. Marfan doesn't assume liability about the use of such information and doesn't give warranties about the final goods made by the customer.

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