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diPRO® Materials for Digital Production

Attachment to Overview List No. 530 – DIPRO®blend HPO LOW-SHRINK advanced Comparison (unreinforced, glass fiber reinforced, low talc reinforced)

HPO (High-Performance Polyolefin) is a new material group developed by **DIPRO®mat**, positioned between PP/PO and engineering thermoplastics.

PP-H and PP-C are popular thermoplastics with an attractive cost-performance ratio. However, mold shrinkage is very high, and PP/PO is hardly suitable for 3D printing.

With **DIPRO®blend H3**, it has been possible to reduce shrinkage by at least 50%, enabling both 3D printing and injection molding with very low shrinkage and barely measurable warpage.

With the new **DIPRO®blend C13 series**, it has even been possible to further drastically reduce shrinkage in unreinforced HPO (High-Performance Polyolefin) to a range of -0.1% / +0.1% (0.2%).

Main Advantages of DIPRO®blend H and DIPRO®blend C

- DIPRO®blend H: low mold shrinkage
- DIPRO®blend C: barely measurable, minimal shrinkage
- excellent dimensional stability and 3D printability
- very good notched impact strength down to -30 °C
- outdoor stabilization options available
- modulus of elasticity adjustable over a wide range
- good chemical resistance
- can be colored as desired using PO masterbatch

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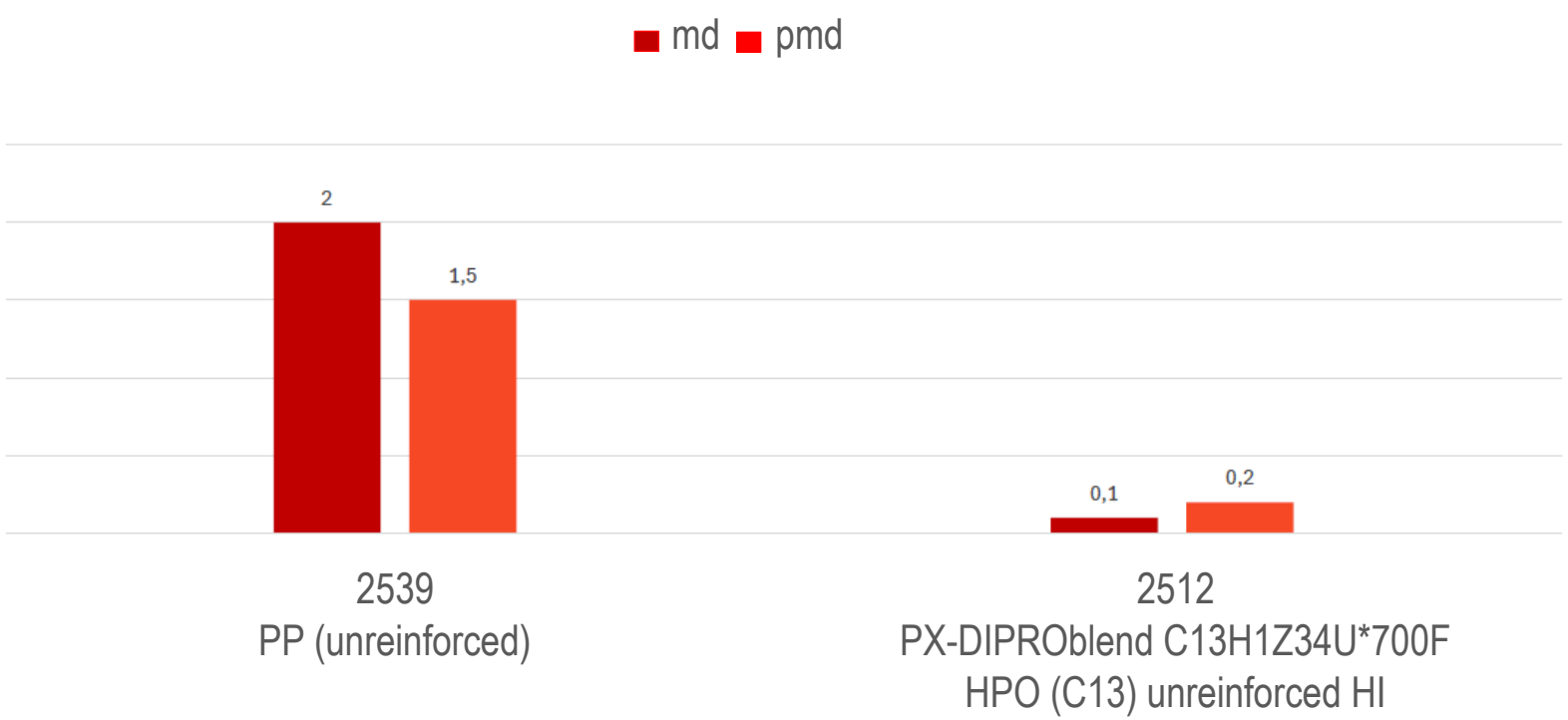
Processing Shrinkage, Test Plate 61x61x2 mm



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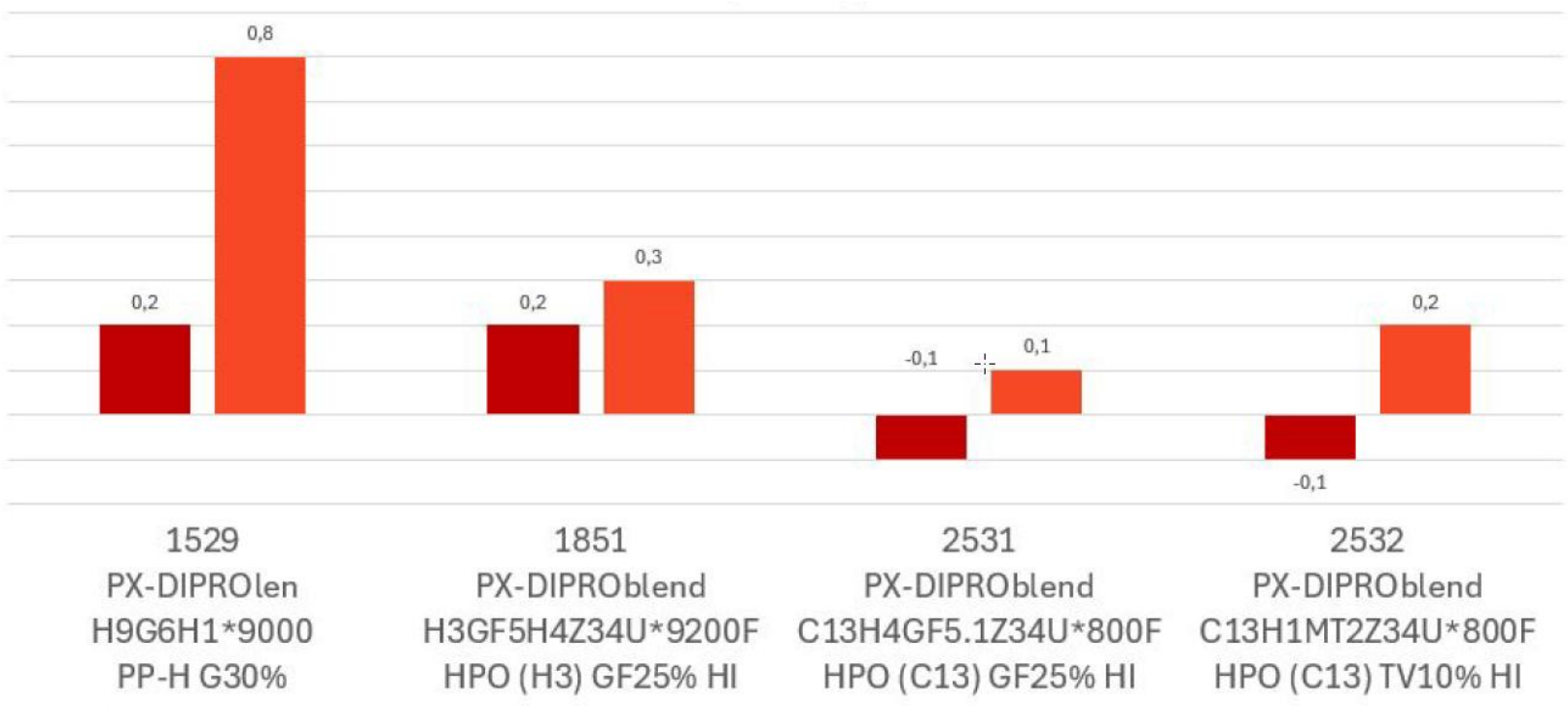
Processing Shrinkage, Test Plate 61x61x2 mm



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The following polymers are compared in Overview List No. 530:

PX-DIPROlen-H9G6H1*9000, Product ID 1529	PP-H with 30% standard glass fiber reinforcement
PX-DIPROblend H3GF5H4Z34U*9200F, Product ID 1851	HPO with 25% special glass fiber reinforcement, “H3” polymer
PX-DIPROblend C13H4GF5.1Z34U*800F, Product ID 2531	HPO with 25% special glass fiber reinforcement, “C13” polymer
PX-DIPROblend C13H1MT2Z34U*800F, Product ID 2532	HPO with 10% talc reinforcement, “C13” polymer
PX-DIPROblend C13H1Z34U*700F, Product ID 2512	Unreinforced HPO, “C13” polymer
PP (unverstärkt), Product ID 2539	

Name: 46 DIPROblend H/C, LOW-SHRINK advanced / Vergleich PP vs HPO=High-Performance-Polyolefin # ID: 530
Description: 46 DIPROblend H/C, LOW-SHRINK advanced / Comparison PP vs HPO=High-Performance-Polyolefin #

Characteristics	**Unit**	**Standard**	PX-DIPROlen-H9G6H1*9000 Product-ID: 1529	DIPROblend H3GF5H4Z34U*9200F Product-ID: 1851	PX-DIPROblend C13H4GF5.1Z34U*800F Product-ID: 2531	PX-DIPROblend C13H1MT2Z34U*800F Product-ID: 2532	PX-DIPROblend C13H1Z34U*700F Product-ID: 2512	PP (unverstärkt) Product-ID: 2539
PHYSICAL PROPERTIES	Unit	Standard	Value	Value	Value	Value	Value	Value
Density	g/cm³	ISO 1183	1,13	1,09	1,09	0,97	0,91	0,91
Water absorption								
24 h	%	ISO 62*	0,01	0,02	0,03	0,03	0,03	0,02
saturation	%	ISO 62*	0,1	0,1	0,1	0,1	0,1	< 0,1
Molding shrinkage (MD/TD) test plate 61x61x2 mm	%	ISO 294-4*	0,2 / 0,8	0,2 / 0,3	-0,1 / 0,1	-0,1 / 0,2	0,1 / 0,2	2 / 1,5
Warpage	mm	Inhouse	16	0,9	0,03	0,07	0,04	
MECHANICAL PROPERTIES	Unit	Standard	Value	Value	Value	Value	Value	Value
Izod impact notched / 23°C	kJ/m²	ISO 180/A	10 /	40 /	44 /	55 /	55 /	/
Charpy impact notched / 23°C	kJ/m²	ISO 179-1/1eA	10 /	41 /	45 /	67 /	70 /	/
Charpy impact strength								
+ 23°C	kJ/m²	ISO 179-1/1eU	48 /	92 /	103 /	NB /	NB /	/
Tensile modulus (1 mm/min)	MPa	ISO 527-1/-2	6.290 /	3.000 /	2.600 /	820 /	808 /	/
Stress at break (50 mm/min)	MPa	ISO 527-1/-2	88 /	51 /	39 /	14 /	15 /	/
Tensile stress at break	MPa	ISO 527-1/-2	87 /	39 /	33 /	19 /	22 /	/
Strain at break	%	ISO 527-1/-2	3,3 /	11 /	11 /	550 /	620 /	/
Flexural strength	MPa	ISO 178	/	/	/	/	/	/
Flexural modulus / 23°C	MPa	ISO 178	/	/	/	/	/	/

Characteristics	**Unit**	**Standard**	PX-DIPROlen-H9G6H1*9000 Product-ID: 1529	DIPROblend H3GF5H4Z34U*9200F Product-ID: 1851	PX-DIPROblend C13H4GF5.1Z34U*800F Product-ID: 2531	PX-DIPROblend C13H1MT2Z34U*800F Product-ID: 2532	PX-DIPROblend C13H1Z34U*700F Product-ID: 2512	PP (unverstärkt) Product-ID: 2539
THERMAL PROPERTIES	Unit	Standard	Value	Value	Value	Value	Value	Value
Vicat softening temperature 50 K/h, 10 N	°C	ISO 306	162	130	123	112	114	
Vicat softening temperature 50 K/h, 50 N	°C	ISO 306	128	74	45	40	40	
Temp. of deflection under load (HDT) / 0,45 MPa	°C	ISO 75-1/-2	159	122	143	86	81	
Temp. of deflection under load (HDT) / 1,81 MPa	°C	ISO 75-1/-2	143	71	113	47	45	
BURNING BEHAVIOR	Unit	Standard	Value	Value	Value	Value	Value	Value
UL94 (0,4/0,8/1,6/3,2 mm)		UL94*	/ / /	/ / /	/ / /	/ / /	/ / /	/ / /
FLOW CHARACTERISTICS	Unit	Standard	Value	Value	Value	Value	Value	Value
Spiral 1,5 x 5 mm @ 400/1000/1600 bar	cm	Inhouse	12 / 28 / 42	10 / 25 / 37	17 / 36 / 50	20 / 40 / 58	20 / 41 / 58	/ /