

Table S1. Key functional properties of PP for automotive application [24]

Application type	Example	Key functional properties
Exterior	Bumper fascia	lower coefficient of thermal expansion (LCTE), impact, rigidity, paint adhesion and durability (painted), UV resistance (nonpainted)
	Spoiler	Low T impact
	Bumper beam	Energy absorption, rigidity
	Side cladding, strips	LCTE, impact, UV
	Rocker panels	LCTE, impact, paintability
	Wheel arch liners	Impact
Interior	Upper interior trim	Impact, scratch resistance, rigidity
	Lower interior trim	Rigidity, impact
	Door panels, cases	Impact, rigidity
	Seating structures	Rigidity, impact
	Seating trim	Rigidity, scratch resistance
	Rigid instrument panel	Impact, scratch resistance
	Centre console	Impact, scratch resistance, high T dimensional stability
	Instrument panel retainer	Impact, dimensional stability
Under hood	Filter housings	Rigidity, high T dimensional stability
	Fan shroud	Rigidity, dynamic toughness
	Fluid header tanks	Impact, temp. resistance
	Battery tray	Rigidity, chemical resistance, dynamic toughness
	Air ducts, HVAC ducting	Rigidity, high T dimensional stability
	Engine covers	Impact, high-temperature rigidity
	Front end	Rigidity, dynamic toughness
Electrical	Battery cases	Chemical resistance, impact, low blush
	Cables	Flame retardancy, softness, temperature resistance

Table S2. Data collected from product data sheets, R: recycled PP, V: virgin PP; PP types and compositions unknown

Melt Flow Rate / g 10min ⁻¹				Tensile Modulus / MPa			Elongation at Break / 1.-%			Yield Strength / MPa				Impact Strength, 23°C / kJ m ⁻²			
R	R	V	V	R	R	V	R	R	V	R	R	V	V	R	R	V	V
12.5	14	32	45	1200	600	1600	50	86	55	27	36.2	33.3	28	5	4	1.5	4,2
20	10.83	24	1.8	1200	606	1700	16	51.15	65	24	20	38.3	26	5.5	3.9	4	50
40	16.3	1.8	11	1200	1150	1130	1.84	50	500	24	20	39	28	5.5	5.5	2	50
12	0.55	1.8	12	1200	860	2500	1.64	44.6	500	25		40	30.8	5.5	2.6	5	25
12	50.4	12	20	1200	611	1650	1.3	45.4	600	25		33	20.3	5.5	2.2	3.5	12
23	43.1	22	35	1200	615	1300	1.24	93	220	25		32	31.4	5.5	3	3.5	8
43	47.4	8	2	1200	625	500	0.99	100	100	25		30	26	5	3	3.5	13
10	17.8	25	3.5	1150	1700	1300	1.02	200	500	21		36	25.6	4	2	3	8
8	20.6	25	0.25	1300	1750	670	1.5		3.3	27		41	30	6.8	5.8	2.5	5
18.4	11.6	35	0.3	1100	1800	600	2.5		50	27		15	25	4.8	4.7	7	12
20	6	47	1.9	1299	1930	1000	2.48		45	28		35	23	1.9	8.4	8	7
0.803	7	4	1.5	1150	2000	900	2.3		50	10.6		40	25	3.1	5.8	50	
11.801	30	18	13	1373.1	2040	900	2.3		90	10.5		36	25	2.2	10.4	12	
12.772	7.7	3	70	1435.4	1141	1150	2.58		150	10.1		30	23	2.8	8.1	8	
3.932		3	110	1399.6	2000	900	124		250	11.2		25	27	4.7	7.5	10	
4.029		0.25	1.9	1414.2	223	1100	1.74		400	9.4		28	25	5.6	7	5	
7.114		0.3	20	1380.5		1200	1.99		60	38		27	25	9.3	7.2	4	
7.432		2.2	11	1467.9		1100	1.59		50	29.5		25	27	9.3	2.1	50	
10.9		3.3	135	1509.3		1000	1.44		25	29.4		29	26	10.1		35	
11		14	30	1515.7		1150	1.6		75	29.2		31	23	3.8		50	
11		3	30	1508.4		1300	3.88			34.75		29	18	3.6		30	
11		3	2	1552.9		1300	3.28			34.8		28	25	3.2		8	
11.8		4	12	1452.3		1200	2.89			35.16		29.4	26	3.4		20	
13.5		3	0.3	1502.7		1250	3.57			36		29.4	24	3.4		11	
6.5		2	1.3	1697.3		1200	3.72			36.1		28		24.9		5	
7.3		0.85	4	1573.2		1500	3.55			36.4		28		12.2		5	
8.16		0.3	3.5	1599.2		1300	350			36.5		31		12.9		15	
6.83		0.8	13	1481.3		1000	370			36.25		28		6.5		20	
8.3		1.3	12	1589.4		1300	351			20		27		11.2		20	
8.83		1.2	20	1549.7		1200	325			12.8		28.3		4.2		7	
8		0.8	12	1484		1150	309			34.7		27		4.3		20	
8.83		0.6	6.5	1556.5		1120	21			34.8		25		3.5		6	
11.3		1.5	8	1542.1		1000	65.4			35.2		25		4.5		4	
9.16		40	15	1282.4		800	63.1			35.9		26		4.7		4.5	
9.3		20	12	2039.3		1200	61.5			36		24		4.6		7	
12		3	20	1616.8		2300	61.9			36.3		28		6.7		6	
7.5		6	7	610		1150	57.3			36.4		30		3.2		6.8	

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