

GENERIC SPECIFICATION FOR RECYCLED PLASTIC MATERIAL INTEGRATED IN AUTOMOTIVE PARTS POLYPROPYLENE

1. INTRODUCTION

Aware of the challenges and opportunities of the circular economy, the automotive industry has for many years integrated this logic into its supply chains. With nearly 30% by mass of recycled materials (all materials combined) on average in French branded automobiles, the automotive industry is one of the industries that consumes the most recycled materials. Almost 65% of the production of recycled polypropylene is now consumed in France by the automotive industry.

The players in the automotive industry are experienced in the efficient use of resources and in achieving recyclability targets for their products. They rely on their partners in the downstream recycling sector. The implementation of solutions aimed at extending the life of vehicles and components and preserving the use of resources is guided by environmental and economic factors and is already part of the intrinsic values of our industry.

For more information on the use of plastics in the automotive sector, we invite you to visit the Plastic Europe website : <https://www.plasticseurope.org/en/resources/market-data>.

The objective of the automotive sector in the framework of the circular economy roadmap is to continue this dynamic. The French automotive industry has thus validated a generic specification for various plastic parts, making it possible to define the main characteristics expected from recycled materials. This work could be cross-cutting with other industrial sectors.

These specifications target recycled materials Polypropylene for automobile parts.

This document has been written by the entire French automotive industry : original equipment manufacturers (CCFA, PSA GROUP, RENAULT GROUP), tiers and plastics industries (FAURECIA, FIEV, GPA, PLASTIC-OMNIUM, VALEO). On the basis of these specifications, the sector will study the materials proposed for validation in automotive parts.

These generic specifications are now available in French and English on the Automotive Platform website <https://pfa-auto.fr/>

2. OBJECTIVES :

This document aims to share, with main plastic and recycled players, some technical data, including main key characteristics of polypropylene material based in automotive parts, and accordingly to be able to sort future proposal of recycled plastic material.

This document targets polypropylene material based, as main plastic material family in automotive parts.

Values presented in this document are only indicatives and cannot substitute specification of each OEMs and Tiers. Some values may be different and more restrictive, and other characteristics might be requested in some cases.

3. LIST OF TECHNICAL DATA SHEET

Technical Data Sheet n°1 : unfilled P/E or PP for interior applications

Technical Data Sheet n°2 : unfilled P/E or PP for exterior applications

Technical Data Sheet n°3 : low filled P/E or PP for interior applications

Technical Data Sheet n°4 : low filled P/E or PP for exterior applications

Technical Data Sheet n°5 : highly filled P/E or PP for interior applications

Technical Data Sheet n°6 : highly P/E or PP for exterior applications

DATA SHEET N° 1	UNFILLED P/E OR PP FOR INTERIOR APPLICATIONS
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Material family:	UNFILLED P/E OR PP
Color:	Black or specific color of OEMs
Applications:	Injected, non-visible and visible applications for interior auto

CHARACTERISTICS	STANDARDS	UNITS	CONDITIONS	MINI VALUES	MAXI VALUES
Melt Flow Rate (MFR)	ISO 1133	cm ³ /10mn	230°C/2,16kg	8	20
Density	ISO 1183	g/cm ³	23°C	0,89	0,92
Ash content	ISO 3451/1	%	650°C/2h	0	<4
Volatile content	Internal test method	%	90°C/5mn		<0,2%
HDT B				>60	
Tensile Modulus	ISO 527-2	Mpa	23°C	750	1600
Unnotched Charpy Impact	ISO 179/1eA	KJ/m ²	4J/+23°C	>40	No break
Unnotched Charpy Impact	ISO 179/1eA	KJ/m ²	4J/-20°C	To report	To report
Notched Chapry Impact	ISO 179/1eA	KJ/m ²	4J/+23°C	>4	No break
Shrinkage	ISO 294-4			1,20%	1,80%

Example of other characteristics needed for some applications	Odor & VOC	If visible: scratch, UV	Fogging	Heat ageing	flammability
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Typical injection process temperature : 190°C-260°C

DATA SHEET N° 2	UNFILLED P/E OR PP FOR EXTERIOR APPLICATIONS
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Material family:	UNFILLED P/E OR PP
Color:	Black or specific color of OEMs
Applications:	Injected, non-visible and visible applications for exterior auto

CHARACTERISTICS	STANDARDS	UNITS	CONDITIONS	MINI VALUES	MAXI VALUES
Melt Flow Rate (MFR)	ISO 1133	cm ³ /10mn	230°C/2,16kg	8	20
Density	ISO 1183	g/cm ³	23°C	0,89	0,92
Ash content	ISO 3451/1	%	650°C/2h	0	<4
Volatile content	Internal test method	%	90°C/5mn		<0,2%
HDT B				>60	
Tensile Modulus	ISO 527-2	Mpa	23°C	750	900
Unnotched Charpy Impact	ISO 179/1eA	KJ/m ²	4J/+23°C	>40	No break
Unnotched Charpy Impact	ISO 179/1eA	KJ/m ²	4J/-20°C		No break
Notched Chapry Impact	ISO 179/1eA	KJ/m ²	4J/+23°C	40	No break
Shrinkage	ISO 294-4			1,20%	1,80%

Example of other characteristics needed for some applications	Scratch, UV
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Typical injection process temperature : injection 190°-260°

DATA SHEET N° 3	LOW FILLED P/E OR PP FOR INTERIOR APPLICATIONS
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Material family:	Filled P/E or PP
Color:	Black or specific color of OEMs
Applications:	Injected, non-visible and visible applications for interior auto

CHARACTERISTICS	STANDARDS	UNITS	CONDITIONS	MINI VALUES	MAXI VALUES
Melt Flow Rate (MFR)	ISO 1133	cm ³ /10mn	230°C/2,16kg	8	20
Density	ISO 1183	g/cm ³	23°C	0,92	0,98
Ash content	ISO 3451/1	%	650°C/2h	4	12
Volatile content	Internal test method	%	90°C/5mn		<0,2%
HDT B				>70	
Tensile Modulus	ISO 527-2	Mpa	23°C	1000	2100
Unnotched Charpy Impact	ISO 179/1eA	KJ/m ²	4J/+23°C	>20	No break
Unnotched Charpy Impact	ISO 179/1eA	KJ/m ²	4J/-20°C	To report	To report
Notched Chapry Impact	ISO 179/1eA	KJ/m ²	4J/+23°C	>4	No break
Shrinkage	ISO 294-4				<1,3

Example of other characteristics needed for some applications	Odor & VOC	If visible: scratch, UV	Fogging	Heat ageing	flammability
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Typical injection process temperature : injection 190°C-260°C

DATA SHEET N° 4	LOW FILLED P/E OR PP FOR EXTERIOR APPLICATIONS
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Material family:	Filled P/E or PP
Color:	Black or specific color of OEMs
Applications:	Injected, non-visible and visible applications for exterior auto

CHARACTERISTICS	STANDARDS	UNITS	CONDITIONS	MINI VALUES	MAXI VALUES
Melt Flow Rate (MFR)	ISO 1133	cm ³ /10mn	230°C/2,16kg	8	20
Density	ISO 1183	g/cm ³	23°C	0,92	0,98
Ash content	ISO 3451/1	%	650°C/2h	4	12
Volatile content	Internal test method	%	90°C/5mn		<0,2%
HDT B				>70	
Tensile Modulus	ISO 527-2	Mpa	23°C	1000	1500
Unnotched Charpy Impact	ISO 179/1eA	KJ/m ²	4J/+23°C	>20	No break
Unnotched Charpy Impact	ISO 179/1eA	KJ/m ²	4J/-20°C	To report	To report
Notched Chapry Impact	ISO 179/1eA	KJ/m ²	4J/+23°C	40	No break
Shrinkage	ISO 294-4				<1,3

Example of other characteristics needed for some applications	Scratch, UV
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Typical injection process temperature : injection 190°C-260°C

DATA SHEET N° 5	HIGHLY FILLED P/E OR PP FOR INTERIOR APPLICATIONS
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Material family:	Filled P/E or PP
Color:	Black or specific color of OEMs
Applications:	Injected, non-visible and visible applications for interior auto

CHARACTERISTICS	STANDARDS	UNITS	CONDITIONS	MINI VALUES	MAXI VALUES
Melt Flow Rate (MFR)	ISO 1133	cm ³ /10mn	230°C/2,16kg	8	25
Density	ISO 1183	g/cm ³	23°C	0,98	1,15
Ash content	ISO 3451/1	%	650°C/2h	10	25
Volatile content	Internal test method	%	90°C/5mn		0,3%
HDT B				>85	110°C
Tensile Modulus	ISO 527-2	Mpa	23°C	>1400	
Unnotched Charpy Impact	ISO 179/1eA	KJ/m ²	4J/+23°C	>5	
Unnotched Charpy Impact	ISO 179/1eA	KJ/m ²	4J/-20°C	To report	To report
Notched Chapry Impact	ISO 179/1eA	KJ/m ²	4J/+23°C	>5	35
Shrinkage	ISO 294-4			0,7%	1,20%

Example of other characteristics needed for some applications	Odor & VOC	If visible: scratch, UV	Fogging	Heat ageing	flammability
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Typical injection process temperature : injection 190°C-260°C

DATA SHEET N° 6	HIGHLY FILLED P/E OR PP FOR EXTERIOR APPLICATIONS
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Material family:	Filled P/E or PP
Color:	Black or specific color of OEMs
Applications:	Injected, non-visible and visible applications for exterior auto

CHARACTERISTICS	STANDARDS	UNITS	CONDITIONS	MINI VALUES	MAXI VALUES
Melt Flow Rate (MFR)	ISO 1133	cm ³ /10mn	230°C/2,16kg	6	29
Density	ISO 1183	g/cm ³	23°C	0,98	1,15
Ash content	ISO 3451/1	%	650°C/2h	15	25
Volatile content	Internal test method	%	90°C/5mn		<0,2%
HDT B				>85	
Tensile Modulus	ISO 527-2	Mpa	23°C	1600	2200
Unnotched Charpy Impact	ISO 179/1eA	KJ/m ²	4J/+23°C	>5	
Unnotched Charpy Impact	ISO 179/1eA	KJ/m ²	4J/-20°C	To report	To report
Notched Chapry Impact	ISO 179/1eA	KJ/m ²	4J/+23°C	4	10
Shrinkage	ISO 294-4			0,7%	1,20%

Example of other characteristics needed for some applications	Scratch, UV
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Typical injection process temperature : injection 190°C-260°C