

Marking products made of technical thermoplastics

1 Introduction

Thermoplastics can be recycled for reuse. Although thermal stresses and other aging can cause a degradation of properties, these kinds of recycled materials represent valuable raw materials. For this process, the various grades of plastic should be collected separately according to whether they are unreinforced, reinforced or flame retardant.

To produce high-quality recycled materials, however, it is essential to collect different grades of plastic – and where possible colors – separately. This requires type-specific marking of plastics products. More detailed material marking that includes additional information on brand name, grade, date and molding compound may also be expedient.

The following technical information describes the marking of plastics products according to ISO 11469 for the thermoplastics Apec®, Bayblend®, Makroblend® and Makrolon® from Covestro.

1.1 Material marking

The marking consists of the abbreviated terms and symbols for the polymer and additives according to ISO 1043/1-4, bracketed by the symbols for “greater than” (>) and “less than” (<).

1.2 Recycling marking

In Germany, the recycling pictograph (recycling triangle) can be used in addition to the material abbreviated terms.



Recycling triangle

2 Examples for the material marking of plastics products

2.1 Basic polymers

For homo- and copolymers, the abbreviated term according to ISO 1043-1 is bracketed by the “>” and “<” symbols.

Examples:

Polycarbonate	>PC<
Polybutylene terephthalate	>PBT<
Polyethylene terephthalate	>PET<
Acrylonitrile-butadiene-styrene plastic	>ABS<
Acrylonitrile-styrene-acrylate plastic	>ASA<
Styrene-acrylonitrile plastic	>SAN<

2.2 Blends

Polymer blends are listed with their abbreviated terms in decreasing order of mass fraction, separated by a plus sign and bracketed by the “>” and “<” symbols.¹⁾

Examples²⁾:

Blend of polycarbonate and acrylonitrile-butadiene-styrene plastic	>PC+ABS<
Blend of polycarbonate and polybutylene terephthalate	>PC+PBT<
Blend of polycarbonate and polyethylene terephthalate	>PC+PET<

2.3 Specific characteristics

Modifications to basic polymers are indicated using additional letters attached to the basic polymer with a hyphen.

Example:

Impact-resistant polycarbonate	>PC-I<
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2.4 Filled or reinforced polymers

For polymers with fillers and reinforcing materials, the appropriate abbreviated terms to ISO 1043-2 are added to the abbreviation of the basic polymer with a hyphen, followed by the mass fraction as a percentage.

Examples:

Polycarbonate, reinforced with
20 % glass fibers >PC-GF20<

Blend of polycarbonate and acrylonitrile-
butadiene-styrene plastic, filled with
10 % talcum powder >PC+ABS-TD10<

Blend of polycarbonate and polyethylene
terephthalate, filled with 15 % of a
mineral filler in powder form >PC+PET-MD15<

2.5 Polymers with flame retardants

The use of flame retardants is indicated with the letters "FR". If the mass fraction is greater than one percent, the chemical composition is included in brackets using code numbers to ISO 1043-4

Examples:

Polycarbonate with flame retardant with a mass
fraction below one percent >PC-FR<

Blend of polycarbonate and acrylonitrile-butadiene-
styrene plastic, halogen-free, organic phosphorous
compound as a flame retardant with a mass fraction
greater than one percent >PC+ABS-FR(40)<

2.6 Products made from several, inseparable polymers

For compound parts, the individual components are listed, separated by commas. The primary visible component is listed first, and the main component by mass is underlined.

Finally, the entire abbreviated term is bracketed by the ">" and "<" symbols.

Example:

Vehicle instrument panel made from PC+ABS (primary
component), PUR foam and TPU film >TPU, PUR, PC+ABS<

3 Type, size and attachment of marking

For the type-specific identification of used plastic parts, the marking should be embossed on the surface of the part in relief or raised.

The font size depends on the size of the part; the recycling symbol should be easily identifiable. The marking must be separate from any company-specific identifying marks.

It should be applied in the most easily accessible location possible.

3.1 Markings for basic polymers in the Covestro product range. Specific grades can have a different composition.

Apec®

Highly heat-resistant PC >PC-HT<³⁾

Bayblend®

PC/ABS-Blend >PC+ABS<

Makroblend®

PC/PBT-blend with impact-resistant modification >PC+PBT-I<
PC/PET-blend with impact-resistant modification >PC+PET-I<

Makrolon®

PC >PC<

¹⁾ In running text, however, spellings such as PC/ABS blend or PC-ABS blend are also common

²⁾ In each of these examples, polycarbonate is the primary component

³⁾ Differs from ISO 1043-1

⁴⁾ Including the relevant special measures IBBS, MAS, MBS

3.2 Product markings for individual product grades⁴⁾

Apec®	
1603, 1695, 1697, 1703, 1745, 1795, 1797, 1803, 1895, 1897, 2095, 2097	>PC-HT< ³⁾
DP1-9354, FR1892	>PC-HT-FR<

Bayblend®	
2953	>PC+ABS<
CG100	>PC+ABS<
ET3032 FR	>PC-I-TD10-FR(40+72)<
ET3036 FR, FR1514, FR3000, FR3000 HI, FR3001, FR3002, FR3005, FR3005 HF, FR3006 HF, FR3008	>PC+ABS-FR(40)<
FR3008 HR	>PC+ABS-I-FR(40)<

Bayblend®	
FR3009, FR3010, FR3010 HF, FR3010 IF, FR3011, FR3012, FR3015	>PC+ABS-FR(40)<
FR3020	>PC+ABS-TD5-FR(40)<
FR3020 W	>PC-I-TD5-FR(40)<
FR3021, FR3021 GR	>PC+ABS-TD15-FR(40)<
FR3030, FR3040, FR3050, FR3100 TV, FR3110 TV, FR3200 TV, FR3210 TV	>PC+ABS-FR(40)<
FR3305 TV	>PC+ABS-GF10-FR(40)<
FR3310 TV, FR3311 TV	>PC+ABS-GF15-FR(40)<
FR410 MT, FR421 MT	>PC-I-TD10-FR(40+72)<
FR630 GR, M301 FR, M303 FR	>PC+ABS-FR(40)<
M750	>PC+ABS<
M850 XF	>PC+ABS<
R-FR610	>PC+ABS-FR(40)<
T45 PG	>ABS+PC<
T50 XF, T65 AT, T65 HG, T65 HI, T65 PG, T65 XF, T80 XG, T85 HG, T85 SG, T85 XF	>PC+ABS<
T88 GF-10	>PC+SAN-I-GF10<
T88 GF-20	>PC+SAN-I-GF20<
T88 GF-30	>PC+SAN-I-GF30<
T90 HT	>PC+ABS<
T90 MF-20	>PC+SAN-I-TD20<
T90 XF, T90 XG	>PC+ABS<
T95 MF	>PC+ABS-TD10<
W85 HI, W85 XF	>PC+ASA<

Makroblend®	
AR205, DP7645	>PC+PET-I<
DP7665	>PC+PET-I-TD20<
EL700	>PC+PET-I-FR(16)<
EL703	>PC+PET-I-FR(14+16)<
KU2-7609	>PC+PBT-I-TD20<
KU2-7912, KU2-7912/4, KU2-7915, M525	>PC+PBT-I<
S7916	>PBT+PC-I<
UT1018, UT203	>PC+PET-I<
UT235M	>PC+PET-TD15<
UT250, UT250 HR	>PC+PET-I<
UT305	>PC+PET<
UT3907	>PC+PBT-I<
UT403	>PC+PET-I<
UT4045 G	>PC+PBT-GF20<
UT408	>PC+PET-I<
UT5205, UT5207, UT6005, UT6007	>PC+PBT-I<

Makrolon®	
1095	>PC-GF15<
1248, 1260, 1837	>PC-I<
1881, 1885	>PC<
1899	>PC-FR(40)<
2205, 2207, 2256, 2258, 2405, 2407, 2408, 2456, 2458	>PC<
2467	>PC-FR<

Makrolon®	
2556, 2558, 2605, 2607, 2608, 2652, 2656, 2658	>PC<
2665, 2667	>PC-FR<
2805, 2807, 2856, 2858	>PC<
2865	>PC-FR<
3105, 3106, 3107, 3108, 3152, 3156, 3158, 3206, 3208, 3258	>PC<
6165 X, 6265 X, 6267 X, 6455, 6457, 6485, 6487, 6555, 6557, 6717	>PC-FR<
8025	>PC-GF20<
8035	>PC-GF30-FR<
8325	>PC-GF20<
8345	>PC-GF35-FR<
9125	>PC-GF20-FR<
9415, 9417	>PC-GF10-FR<
9425	>PC-GF20-FR<
AG2677, AL2447, AL2647, DP1-1821	>PC<
EM9417	>PC-GF10-FR<
ET2613, ET3113, ET3117, ET3127, ET3137, ET3227	>PC<
FR7067, FR7087	>PC-FR(16+40)<
FU1007	>PC<
GF8001	>PC-GF20<
GF8002	>PC-GF15<
GF9002	>PC-GF10-FR<
LED2245 LED2643, LQ2647, LQ3187	>PC<
LTG2623	>PC-FR<
OD2015	>PC<
Rx1452, Rx1805, Rx2430, Rx2530, Rx2635	>PC<
WB1239	>PC<
XT5010	>PC-FR(40)<

Typical value

These values are typical values only. Unless explicitly agreed in written form, they do not constitute a binding material specification or warranted values. Values may be affected by the design of the mold/die, the processing conditions and coloring/pigmentation of the product. Unless specified to the contrary, the property values given have been established on standardized test specimens at room temperature.

The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations, are beyond our control. Therefore, it is imperative that you test our products, technical assistance, information and recommendations to determine to your own satisfaction whether our products, technical assistance and information are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by Covestro.

Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale which are available upon request. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with any claim of any patent relative to any material or its use. No license is implied or in fact granted under the claims of any patent.

With respect to health, safety and environment precautions, the relevant Material Safety Data Sheets (MSDS) and product labels must be observed prior to working with our products.



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