



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 34691.1-2018

**Plastics -- Thermoplastic polyester (TP) moulding and extrusion
materials -- Part 1: Designation system and basis for
specifications**

Issued on: December 28, 2018

Implemented on: November 1, 2019

Issued by: SAMR; SAC

Table of Contents

Foreword	3
1 Scope	5
2 Normative references	6
3 Naming and classification system	6
4 Naming examples	13
Annex A (normative) Naming of thermoplastic polyester	16
Bibliography	19

1 Scope

This Part of GB/T34691 specifies the naming system for thermoplastic polyester (TP) molding and extrusion materials. This system can serve as the basis for classification.

Thermoplastic polyester (TP) materials include homopolyesters based on polyethylene terephthalate (PET), propylene terephthalate (PTT), butyl terephthalate (PBT), cyclohexane dimethyl terephthalate (PCT), polyethylene naphthalate (PEN), butyl naphthalate (PBN), and other types of thermoplastic polyesters (TP) used for molding and extrusion, as well as multi-component copolyesters.

Different types of thermoplastic polyester materials are distinguished by a classification system based on the specified values of characteristic properties, recommended applications and/or processing methods, important properties, additives, colorants, fillers, and reinforcing materials:

- a) Viscosity;
- b) Tensile modulus of elasticity.

This Part applies to all homopolymers and copolymers of thermoplastic polyesters. It is applicable to materials that are typically in powder, particle, or fragmented form, modified by colorants, additives, fillers, and other materials, as well as unmodified materials.

This Part does not apply to saturated polyester/ester and polyether/ester thermoplastic elastomers specified in ISO 20029.

This Part does not imply that materials with the same name necessarily have the same properties. This section does not provide engineering data, performance data, or processing condition data required to illustrate the special uses and/or processing methods of materials. If necessary, these additional properties can be determined according to the

test methods specified in Part 2 of GB/T 34691.

To illustrate the special use of a certain thermoplastic polyester material or to ensure reproducibility of processing, additional requirements can be given in character group 5.

NOTE 1: The viscosity measured with other solvents can be converted into the viscosity measured with phenol/1,2-dichlorobenzene as the solvent using the following formula:

Phenol/1,1,2,2-tetrachloroethane (50/50) as solvent: $x=0.93y+1.87$

Phenol/1,1,2,2-tetrachloroethane (60/40) as solvent: $x=1.20y-13.34$ o-Chlorophenol as

solvent: $x=1.22y-10.24$ Dichloroacetic acid as solvent: $x=1.20y-18.07$ In which:

x is the viscosity measured using phenol/1,2-dichlorobenzene (50/50) as the solvent;

y is the viscosity measured with other corresponding solvents.

NOTE 2: The viscosity measured with other solvents can be converted to the viscosity measured with m-cresol as the solvent using the following formula:

Phenol/1,1,2,2-tetrachloroethane (50/50) as solvent: $x=0.70y+5.59$

Phenol/1,1,2,2-tetrachloroethane (60/40) as solvent: $x=0.57y+29.22$ o-Chlorophenol as

solvent: $x=0.85y+3.14$ Dichloroacetic acid as solvent: $x=0.70y+7.34$

Phenol/1,2-dichlorobenzene as solvent: $x=0.75y+0.96$ In which:

x is the viscosity measured using m-cresol as the solvent;

y is the viscosity measured with other corresponding solvents.

3.5.2.2 For PCT, phenol/1,1,2,2-tetrachloroethane (60/40) shall be used as the solvent to determine viscosity.

3.5.2.3 For amorphous PEN, phenol/1,1,2,2-tetrachloroethane (60/40) shall be used as the solvent to determine the viscosity. For crystalline PEN, phenol/2,4,6-trichlorophenol (60/40) was selected as the solvent to determine the viscosity.

3.5.2.4 For PBN, phenol/1,1,2,2-tetrachloroethane (60/40) shall be used as the solvent to determine viscosity.

3.5.2.5 For other TP homopolymers and copolymers, m-cresol is preferred as the solvent.

3.5.2.6 Divide the viscosity into 8 ranges based on possible values. Each range is

Annex A (normative) Naming of thermoplastic polyester

Thermoplastic polyester materials are thermoplastic materials that contain ester groups (-CO-O-) at regular intervals on linear polymer chains. Straight chain polyester is obtained by condensation reaction of diols with two hydroxyl groups (-OH) and dicarboxylic acids with two carboxyl groups (-COOH) or their esters.

Hydroxycarboxylic acids or their esters can also be used to synthesize polyesters. If

tricarboxylic acids and/or ternary alcohols are used, branched polymers are obtained.

Here are six well-known thermoplastic polyesters:

PET: Polyethylene terephthalate PTT: Polyethylene terephthalate PBT: Polybutylene terephthalate PCT: Polyethylene terephthalate cyclohexane dimethyl ester PEN: Polyethylene naphthalene dicarboxylate PBN: Polybutylene naphthalate For other polyesters and copolyesters, the same naming system as polyamides and copolyamides shall be used (see ISO 16396) to avoid having an abbreviation for each type of polyester.

According to GB/T 1844.1-2008, the symbol for thermoplastic polyester is TP.

Aliphatic polyesters synthesized from diols and linear dicarboxylic acids or their esters are named by two or more numbers. The first (possibly one or two digits) number represents the number of C atoms in linear diols (see Table A.1). The second (possibly one or two digits) number represents the number of C atoms in linear dicarboxylic acids (see Table A.2).

Nonlinear aliphatic, aliphatic, and aromatic polyester materials are named with letter symbols based on the monomer units of the polyester chain (see Table A.1, Table A.2, and Table A.3).

Add a diagonal (/) between the numerical codes representing the various components of copolyesters to name them (see Annex A, A.6 of GB/T 1844.1). Depending on the initial material ratio, copolyesters with the same numerical or letter symbols may have