Polyacetal (POM)

DURACON®

M90-45

CF2001/CD9100/CD9300

Weather Resistant

POLYPLASTICS CO., LTD.

Introduction

Polyacetal resin as well as other thermoplastics is deteriorated and discolored by ultraviolet ray, when it is exposed to the light in outdoor environment etc. In such cases, by use of **DURACON® POM M90-45** of a weather-resistant grade, the deterioration and the related phenomena can be delayed than standard grades.

In this brochure, M90-44 of a standard grade and **M90-45** of a weather-resistant grade are compared, and the effectiveness of **M90-45** is expressed.

General Properties of M90-45

table1-1 General Properties（ISO）

Item	Unit	Test Method	Weather Resistant
			M90-45
			Standard
Color			CF2001/CD9100/CD9300
ISO(JIS)quality-of-the-material display:		ISO11469 (JIS K6999)	>POM<
Density	g/cm^3	ISO 1183	1.41
Water absorption (23°C,24hrs,1mmt)	%	ISO 62	0.6
MFR (190℃、2.16kg)	g/10min	ISO 1133	9
MVR (190℃, 2.16kg)	cm^3/10min	ISO 1133	8
Tensile strength	MPa	ISO 527-1,2	62
Strain at break	%	ISO 527-1,2	35*1
Tensile modulus	MPa	ISO 527-1,2	2,700
Flexural strength	MPa	ISO 178	87
Flexural modulus	MPa	ISO 178	2,500
Charpy notched impact strength (23℃)	kJ/m^2	ISO 179/1eA	6.0
Temperature of deflection under load (1.8MPa)	℃	ISO 75-1,2	95
Coefficient of linear thermal expansion (23 - 55℃、Flow direction)	x10^{-5}/℃	Our standard	12
Coefficient of linear thermal expansion (23 - 55℃、Transverse direction)	x10^{-5}/℃	Our standard	12
Electric strength (3mmt)	kV/mm	IEC 60243-1	19
Volume resistivity	Ω·cm	IEC 60093	4 × 10^{14}
Surface resistivity	Ω	IEC 60093	4 × 10^{15}
Volume resistivity (Our standard)	Ω·cm		-
Surface resistivity (Our standard)	Ω		-
Mold Shrinkage (60×60×2mmt, Flow direction, Cavity Pressure 60 MPa)	%	ISO 294-4	2.4
Mold Shrinkage (60×60×2mmt, Transverse direction, Cavity Pressure 60 MPa)	%	ISO 294-4	2.0
Rockwell hardness	M(Scale)	ISO2039-2	80
Specific wear amount (Thrust, vs C-Steel, material side, pressure 0.49MPa, 30cm/s)	x10^{-3}mm^3/(N·km)	JIS K7218	1.00
Specific wear amount (Thrust, vs C-Steel, steel side, pressure 0.49MPa, 30cm/s)	x10^{-3}mm^3/(N·km)	JIS K7218	0.01>
Coefficient of Dynamic Friction (Thrust, vs C-Steel, pressure 0.49MPa, 30cm/s)		JIS K7218	0.45

Item	Unit	Test Method	Weather Resistant
			M90-45
			Standard
Specific wear amount (Thrust, vs C-Steel, material side, pressure 0.98MPa, 30cm/s)	$x10^{-3}mm^3/(N\cdot km)$	JIS K7218	-
Specific wear amount (Thrust, vs C-Steel, steel side, pressure 0.98MPa, 30cm/s)	$x10^{-3}mm^3/(N\cdot km)$	JIS K7218	-
Coefficient of Dynamic Friction (Thrust, vs C-Steel, pressure 0.98MPa, 30cm/s)		JIS K7218	-
Specific wear amount (Thrust, vs M90-44, material side, pressure 0.06MPa, 15cm/s)	$x10^{-3}mm^3/(N\cdot km)$	JIS K7218	-
Specific wear amount (Thrust, vs M90-44, M90-44 side, pressure 0.06MPa, 15cm/s)	$x10^{-3}mm^3/(N\cdot km)$	JIS K7218	-
Coefficient of Dynamic Friction (Thrust, vs M90-44, pressure0.06MPa, 15cm/s)		JIS K7218	0.37
Flammability		UL94	HB
The yellow card File No.			E45034
Appropriate List number of Ministerial Ordinance for Export Trade Control			Item 16 of Appendix -1

*1) Nominal strain at break

All figures in the table are the typical values of the material and not the minimum values of the material specifications.

1. Moldability of M90-45

1.1 Flowability and mold shrinkage

The moldability of **DURACON® M90-45** is nearly equal to M90-44, a standard grade.

Table 1-2 Flowability and Mold Shrinkage

Item	Unit	Test Method	M90-44	M90-45
Flowability (Bar-shaped cavities, 2mm thick, Inj. pressure 100MPa)	mm	Our standard	400	400
Mold Shrinkage (120×120×2mmt, Flow direction, Inj. pressure 60MPa)	%	Our standard	2.04	2.08
Mold Shrinkage (120×120×2mmt, Trans direction, Inj. pressure 60MPa)	%	Our standard	2.12	2.12

< Molding conditions >
Resin temp.: 200 deg C
Mold temp.: 80 deg C

2. Weather resistance of M90-45

The test results by an artificially accelerated weather-resistant tester are shown below.

2.1 Color difference and retention rate of gloss

The results of light-resistant test by sunshine-type carbon arc (BPT 83 deg C, without water spray) are shown below.

Compared with M90-44, **M90-45** shows good results with small change in color difference and gloss both in natural color and black color.

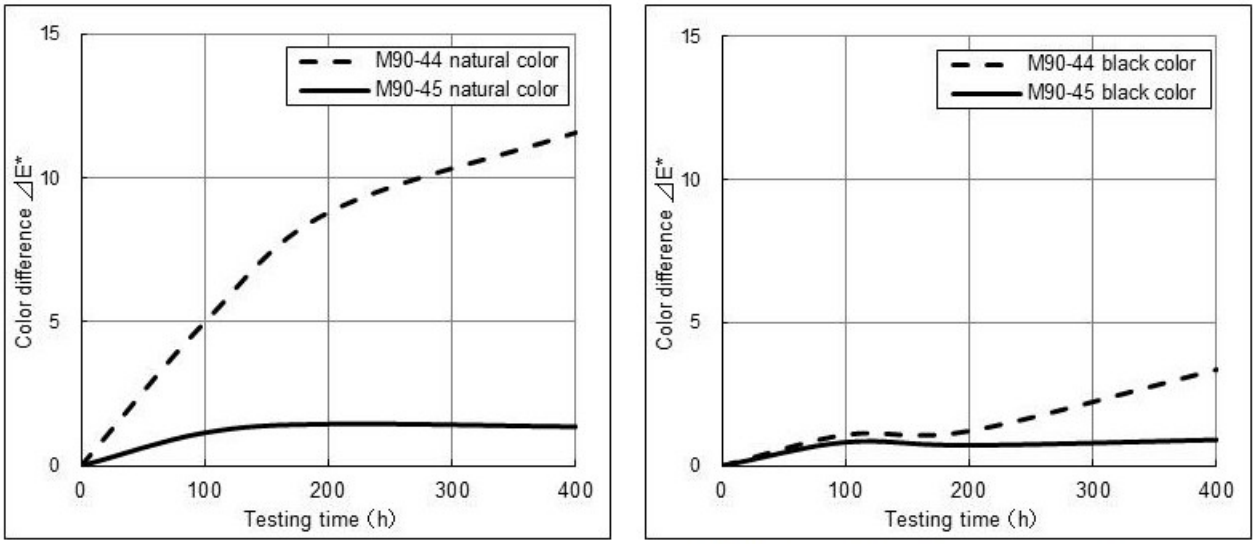


Fig. 2-1 Color difference after weathering test

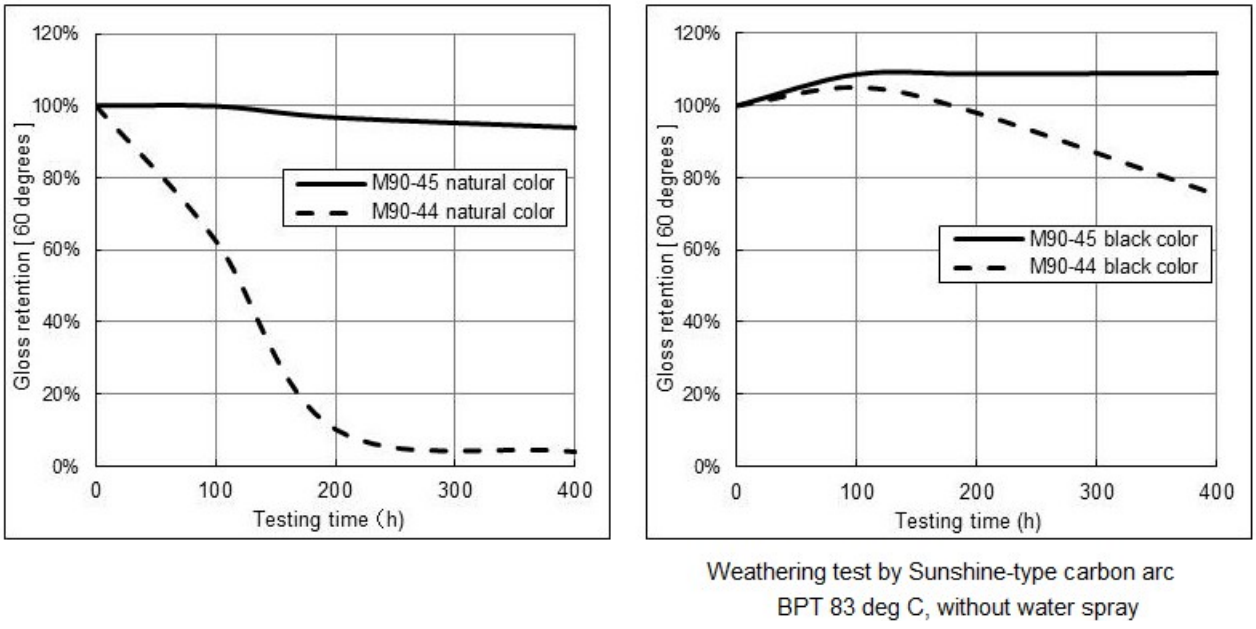


Fig. 2-2 Retension rate of gloss after weathering test

2.2 Changes in physical properties

The results of weather-resistant test by sunshine-type carbon arc (BPT 63 deg C, with water spray) are shown below.
Compared **M90-45** natural color with M90-44 natural color, **M90-45** is superior to M90-44, whose retention rates decrease both in tensile strength and tensile strain from the beginning.

On the other hand, black-colored products do not show such a big difference as natural-colored products, because the black pigment largely protects from the light. However, **M90-45** shows slightly better results in the retention rate of tensile strain.

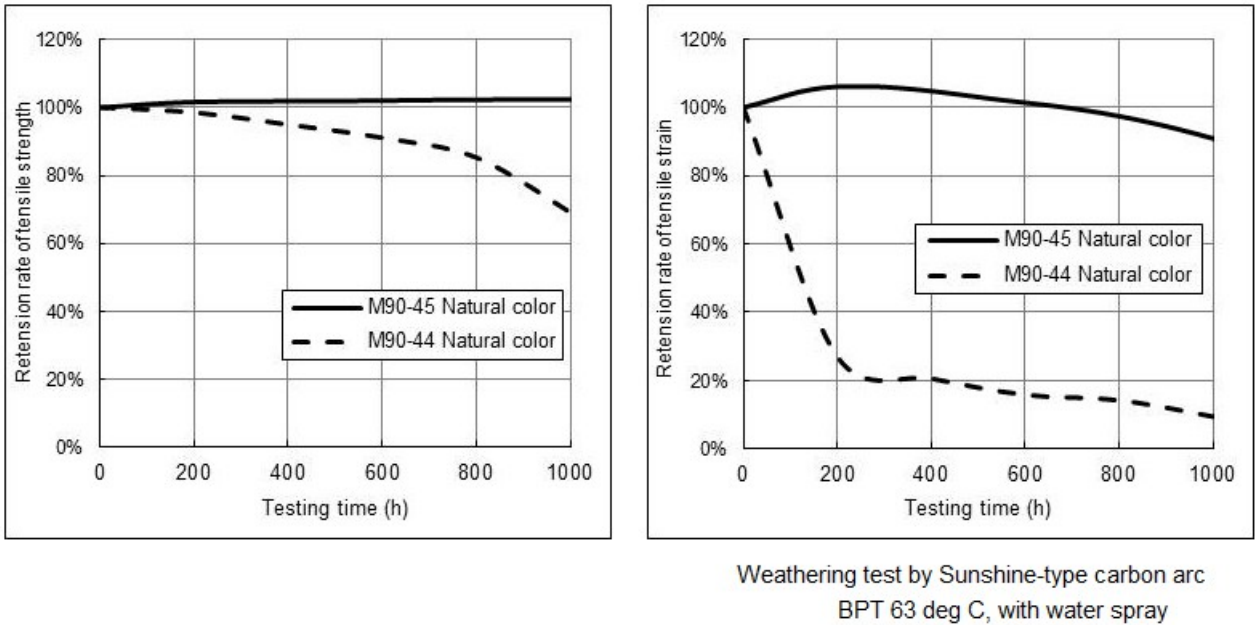


Fig. 2-3 Retension rate of tensile properties after weathering test (Natural color)

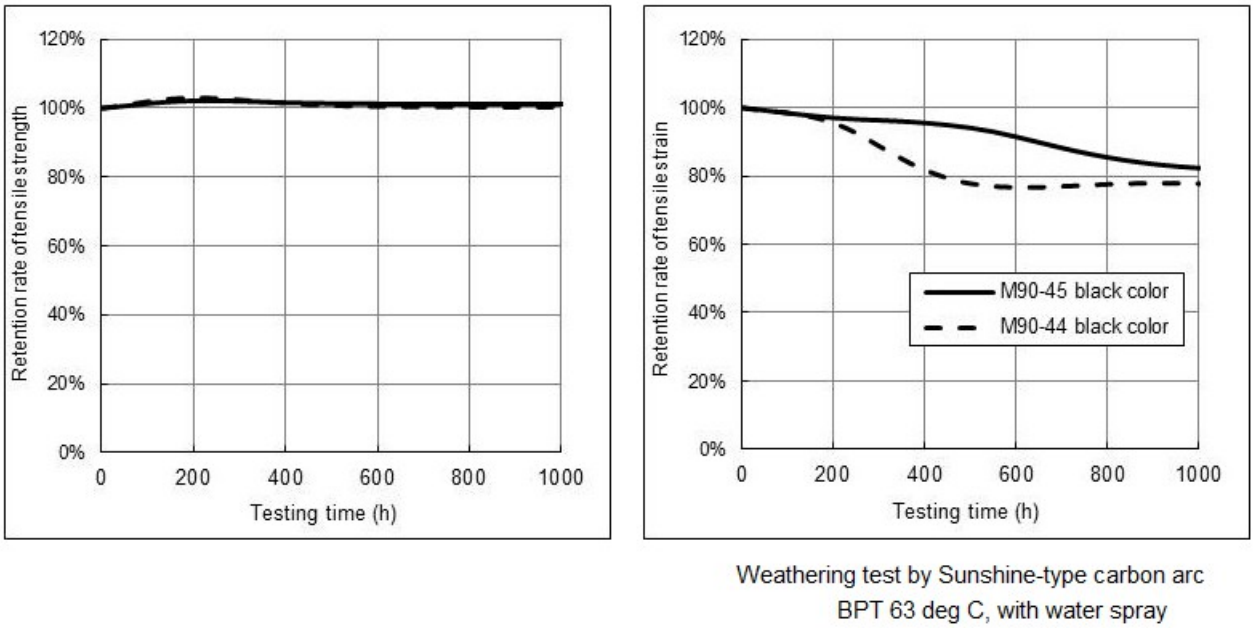
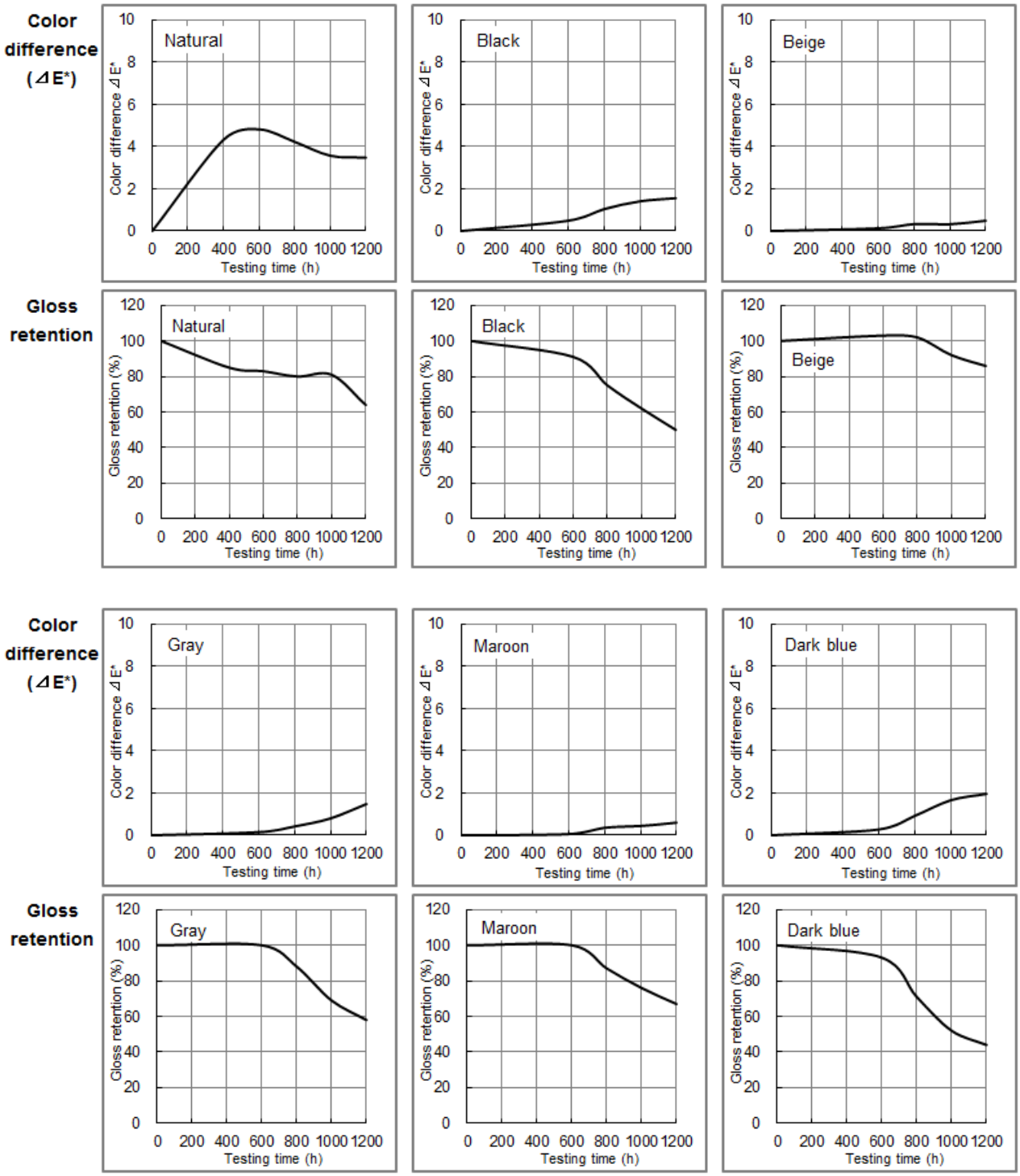


Fig. 2-4 Retension rate of tensile properties after weathering test (Black color)

2.3 Changes in color difference and gloss of colored products

The results of light-resistant test by sunshine-type carbon arc (BPT 83 deg C, without water spray) on typical colored products of **DURACON M90-45** are shown below.

The light resistance is greatly affected by coloring pigments. When colored products of **DURACON** are used for parts where light resistance is required, it is necessary to use pigments suitable for **DURACON**.



Weathering test by Sunshine-type carbon arc, BPT 83 deg C, without water spray

Fig. 2-5 Color difference and Gloss retention after weathering test

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NOTES TO USERS

- All property values shown in this brochure are the typical values obtained under conditions prescribed by applicable standards and test methods.
- This brochure has been prepared based on our own experiences and laboratory test data, and therefore all data shown here are not always applicable to parts used under different conditions. We do not guarantee that these data are directly applicable to the application conditions of users and we ask each user to make his own decision on the application.
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- For safe handling of materials we supply, it is advised to refer to the Safety Data Sheet "**SDS**" of the proper material.
- This brochure is edited based on reference literature, information and data available to us at the time of creation. The contents of this brochure are subject to change without notice upon achievement of new data.
- Please contact our office for any questions about products we supply, descriptive literatures or any description in this brochure.

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(R210827-1132)