Polyacetal (POM)

DURACON®

TR-20

CF2001/CD3501

Mineral Reinforced

POLYPLASTICS CO., LTD.

General Properties of TR-20

table1-1 General Properties（ISO）

Item	Unit	Test Method	Mineral Reinforced
			TR-20
			High Rigidity, Low Warpage
Color			CF2001/CD3501
ISO(JIS)quality-of-the-material display:		ISO11469 (JIS K6999)	>POM-TD15<
Density	g/cm^3	ISO 1183	1.53
Water absorption (23°C,24hrs,1mmt)	%	ISO 62	0.5
MFR (190℃、2.16kg)	g/10min	ISO 1133	21
MVR (190℃, 2.16kg)	cm^3/10min	ISO 1133	16
Tensile strength	MPa	ISO 527-1,2	59
Strain at break	%	ISO 527-1,2	5.0
Tensile modulus	MPa	ISO 527-1,2	4,500
Flexural strength	MPa	ISO 178	96
Flexural modulus	MPa	ISO 178	4,100
Charpy notched impact strength (23℃)	kJ/m^2	ISO 179/1eA	3.0
Temperature of deflection under load (1.8MPa)	℃	ISO 75-1,2	125
Coefficient of linear thermal expansion (23 - 55℃、Flow direction)	x10^{-5}/℃	Our standard	8
Coefficient of linear thermal expansion (23 - 55℃、Transverse direction)	x10^{-5}/℃	Our standard	8
Electric strength (3mmt)	kV/mm	IEC 60243-1	21
Volume resistivity	Ω·cm	IEC 60093	2 × 10^{14}
Surface resistivity	Ω	IEC 60093	9 × 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	1.7
Mold Shrinkage (60×60×2mmt, Transverse direction, Cavity Pressure 60 MPa)	%	ISO 294-4	1.6
Rockwell hardness	M(Scale)	ISO2039-2	75
Specific wear amount (Thrust, vs C-Steel, material side, pressure 0.49MPa, 30cm/s)	x10^{-3}mm^3/(N·km)	JIS K7218	30
Specific wear amount (Thrust, vs C-Steel, steel side, pressure 0.49MPa, 30cm/s)	x10^{-3}mm^3/(N·km)	JIS K7218	0.10
Coefficient of Dynamic Friction (Thrust, vs C-Steel, pressure 0.49MPa, 30cm/s)		JIS K7218	0.50

Item	Unit	Test Method	Mineral Reinforced
			TR-20
			High Rigidity, Low Warpage
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	5.0
Specific wear amount (Thrust, vs M90-44, M90-44 side, pressure 0.06MPa, 15cm/s)	$x10^{-3}mm^3/(N\cdot km)$	JIS K7218	90
Coefficient of Dynamic Friction (Thrust, vs M90-44, pressure0.06MPa, 15cm/s)		JIS K7218	0.40
Flammability		UL94	HB
The yellow card File No.			E45034
Appropriate List number of Ministerial Ordinance for Export Trade Control			Item 16 of Appendix -1

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

Introduction

Duracon® POM TR-5, TR-10D and **TR-20** are grades reinforced by inorganic fillers.

TR series grades have the following advantages.

1) High Rigidity

Compared with the general grade M90, **TR-5, TR-10D** and **TR-20** are improved in flexural strength and flexural modulus due to inorganic fillers reinforcement. Mechanical strength at elevated temperature is also good compared with M90 , judging from improvement in temperature of deflection under load.

2) Low Creep Deformation

TR-5, TR-10D and **TR-20** are not only improved in short-term rigidity, but also have lower longterm creep deformation in comparison with M90.

3) Low Warpage

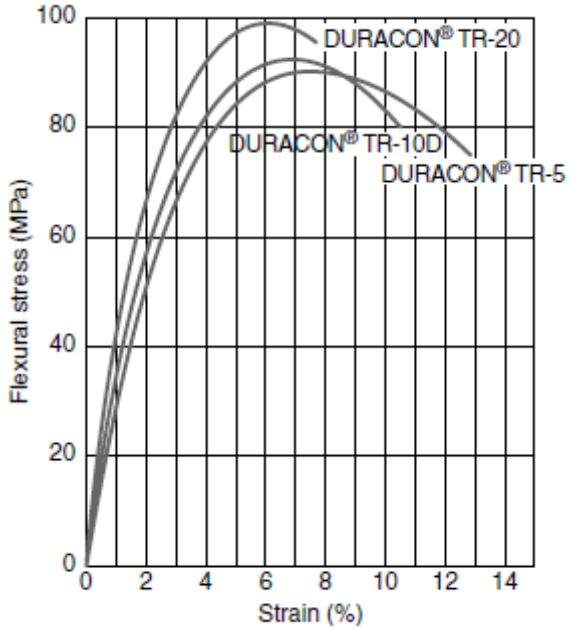
Properties of inorganic fillers used in **TR-5, TR-10D** and **TR-20** do not differ with direction to the same degree as those of glass fibers. Thus, these grades' small anisotropy in mold shrinkage, which is large in glass fiber-reinforced grades, gives effect of low deformation and low warpage.

Flowability, rigidity and toughness of **TR-5, TR-10D** and **TR-20** are provided by formulation of inorganic fillers and base resins. The advantage of each grade is shown below.

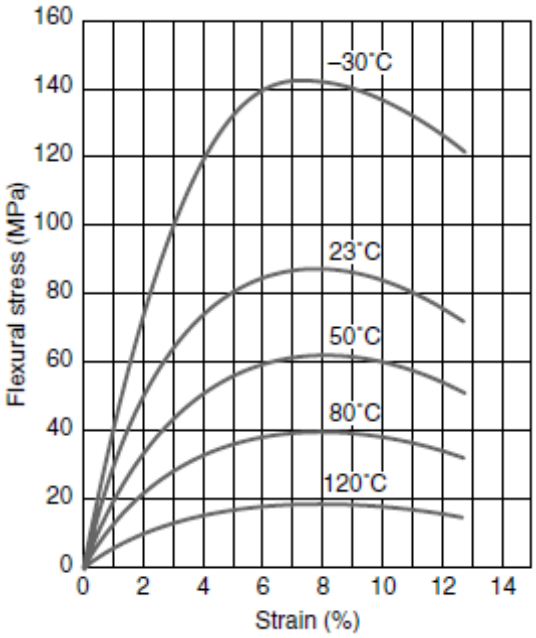
TR-5	**:The grade that balances rigidity and toughness**
TR-10D	**:The grade of high rigidity and especially improved flowability**
TR-20	**:The grade of high rigidity providing an effect of low warpage**

1.Flexural Properties of TR-5, TR-10D, TR-20 (S-S curve)

S-S curve under flexural stress (23°C)

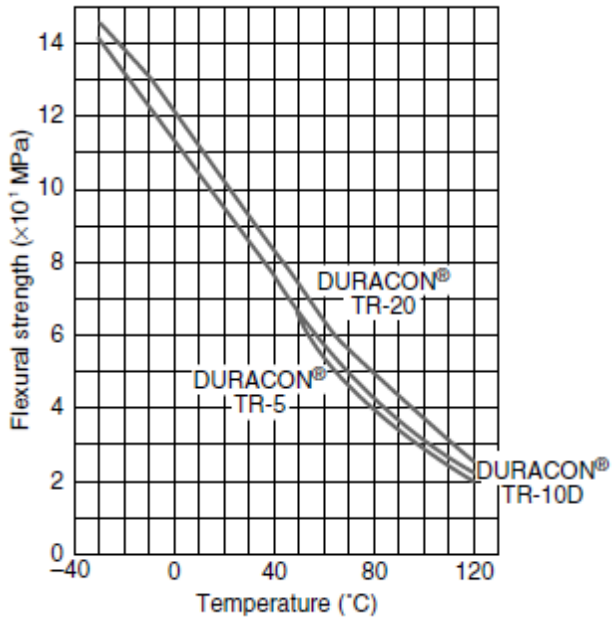


S-S curve of DURACON® POM TR-5 under flexural stress

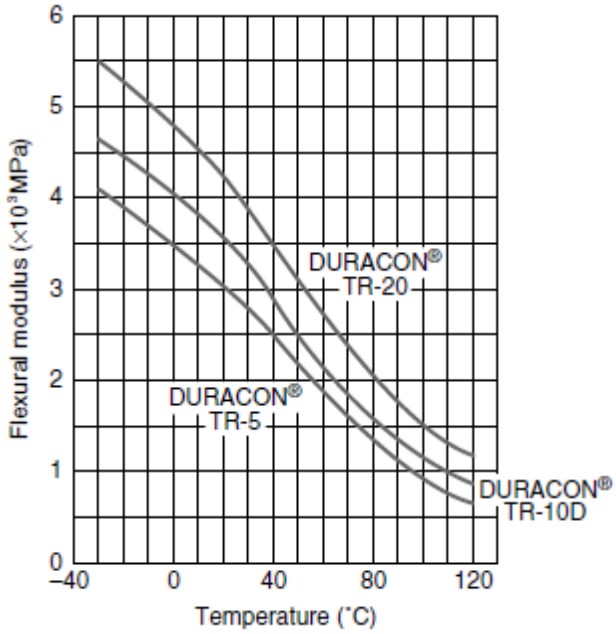


2.Temperature Dependence of TR-5, TR-10D, TR-20

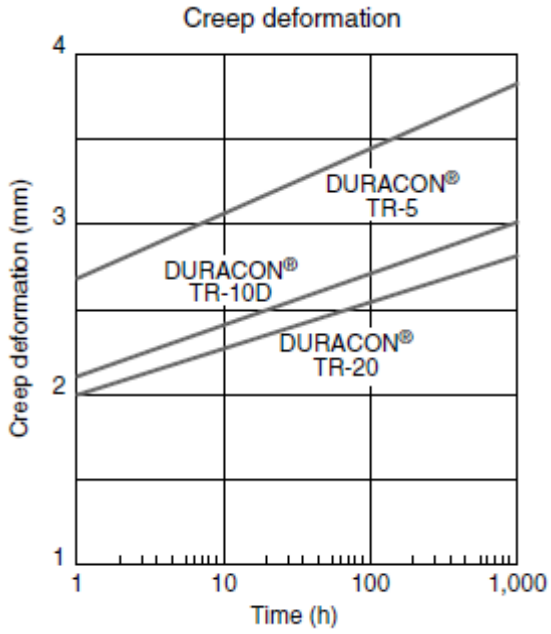
Dependence of flexural strength on temperature



Dependence of flexural modulus on temperature



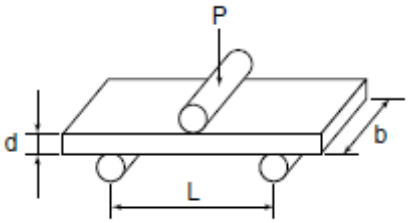
3.Creep Characteristics of TR-5, TR-10D, TR-20



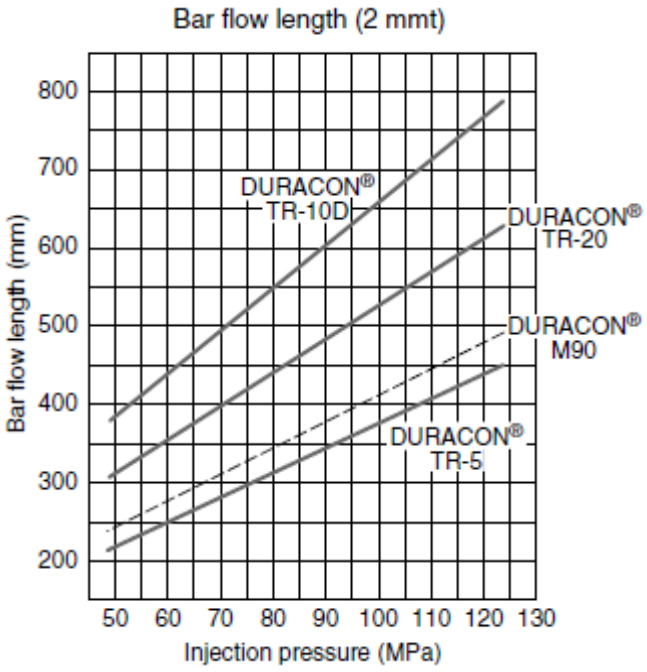
Span:	**L= 50.8 mm**
Width:	**b= 12.7 mm**
Thickness :	**d= 3.2 mm**

Test conditions

Stress :	**σ=19.6 MPa**
Load :	**P=33.4 N**
Temperature :	**60°C**

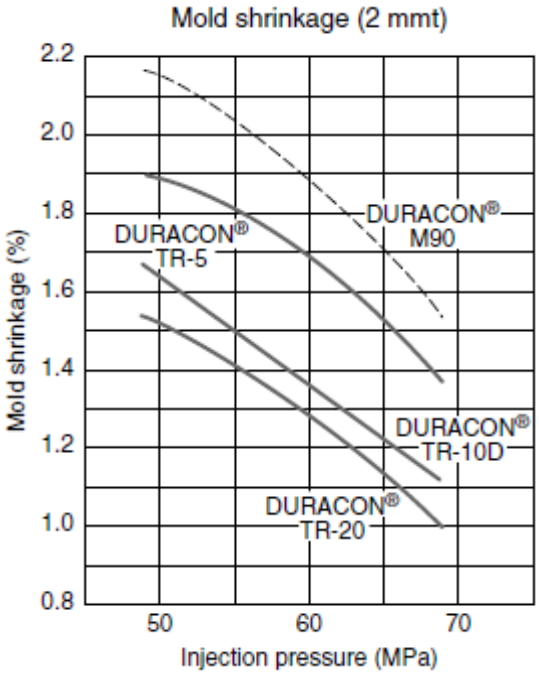


4.Moldability of TR-5, TR-10D, TR-20



Molding conditions

Cylinder temperature :	**190-190-170-150°C**
Mold temperature :	**80°C**
Injection speed :	**67mm/s**
Mold :	**2 mmt bar flow mold**



Molding conditions

Cylinder temperature :200-190-170-150°C

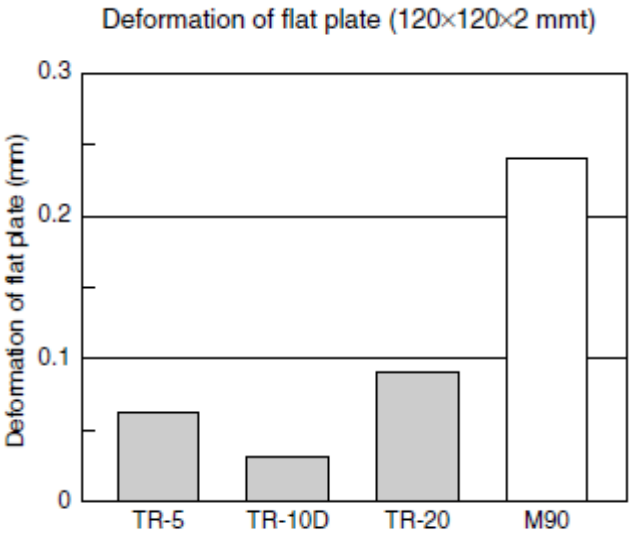
Mold temperature : 80°C

Injection speed: 17mm/s

Cycle : Dwelling for 30 s/cooling for 10 s

Mold : Flat plate 120· 120· 2 mmt

5.Low Warpage of TR-5, TR-10D, TR-20



Molding conditions

Cylinder temperature : 200-190-170-150°C

Mold temperature : 80°C

Injection speed : 17mm/s

Injection pressure maintained: 68.6 MPa

Cycle : Dwelling for 20 s/cooling for 10 s

Mold : Flat plate 120· 120· 2 mmt

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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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