Polyacetal (POM)

DURACON®

LW-02

CF2001/CD3501

High Sliding

POLYPLASTICS CO., LTD.

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Introduction

DURACON® POM has superior friction and wear characteristics utilized generally and is widely used for sliding parts. And with the demand for even more high level friction and wear characteristics, numerous grades have been developed for a variety of applications and are now in use.

DURACON POM LW-02 is a new sliding grade that was developed based on experience we have accumulated over many years.

Though NW-02 is our representative sliding grade suitable for a wide range of applications, LW-02 is a material specialized for greaseless gear and other greaseless applications which we believe can greatly contribute to cost reductions and improve product quality.

1.General Properties of LW-02

Table1-1　General Properties of LW-02（ISO）

Item	Unit	Test Method	High Sliding	High Sliding	Standard
			LW-02	NW-02	M90-44
			for General Purposes	Special lubricant,High sliding	Standard
Color No.			CF2001	CF2001/CD3501	CF2001/CD3068
ISO Marking Code		ISO11469 (JIS K6999)	>POM<	>POM+PE<	>POM<
Density	g/cm³	ISO 1183	1.40	1.36	1.41
MFR (190℃,2.16kg)	g/10min	ISO 1133	27	20	9
Tensile strength	MPa	ISO 527-1,2	53	52	62
Strain at break	%	ISO 527-1,2	45 *1	20 *1	35 *1
Flexural strength	MPa	ISO 178	76	72	87
Flexural modulus	MPa	ISO 178	2350	2200	2500
Charpy notched impact strength (23℃)	kJ/m²	ISO 179/1eA	6.0	5.9	6.0
Temperature of deflection under load (1.8MPa)	℃	ISO 75-1,2	87	85	95
Coefficient of linear thermal expansion (23 – 55℃,Flow direction)	x10⁻⁵/℃	Our standard	11	12	12
Coefficient of linear thermal expansion (23 – 55℃,Flow direction)	x10⁻⁵/℃	Our standard	12	12	12
Electric strength (3mmt)	kV/mm	IEC 60243-1	-	20	19
Volume resistivity	Ω·cm	IEC 60093	-	1×10^{14}	1×10^{14}
Surface resistivity	Ω	IEC 60093	-	3×10^{15}	1×10^{16}
Rockwell hardness	M(Scale)	ISO2039-2	-	70	80
Flammability		UL94	HB	HB	HB
The yellow card File No.			E45034	E45034	E45034
Appropriate List number of Ministerial Ordinance for Export Trade Control			Item 16 of Appendix -1	Item 16 of Appendix -1	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.

2. Wear Characteristics of LW-02

2.1 Friction and Wear Resistance

Fundamentally, when a material slides against another material of the same type, due to repeated adhesion and peeling at the contact surface, dynamic friction coefficient becomes unstable and wear increases. In contrast, LW-02 shows a low amount of wear and low dynamic friction coefficient compared to standard grade M90-44, and also shows good characteristics in comparison with sliding grade NW-02.

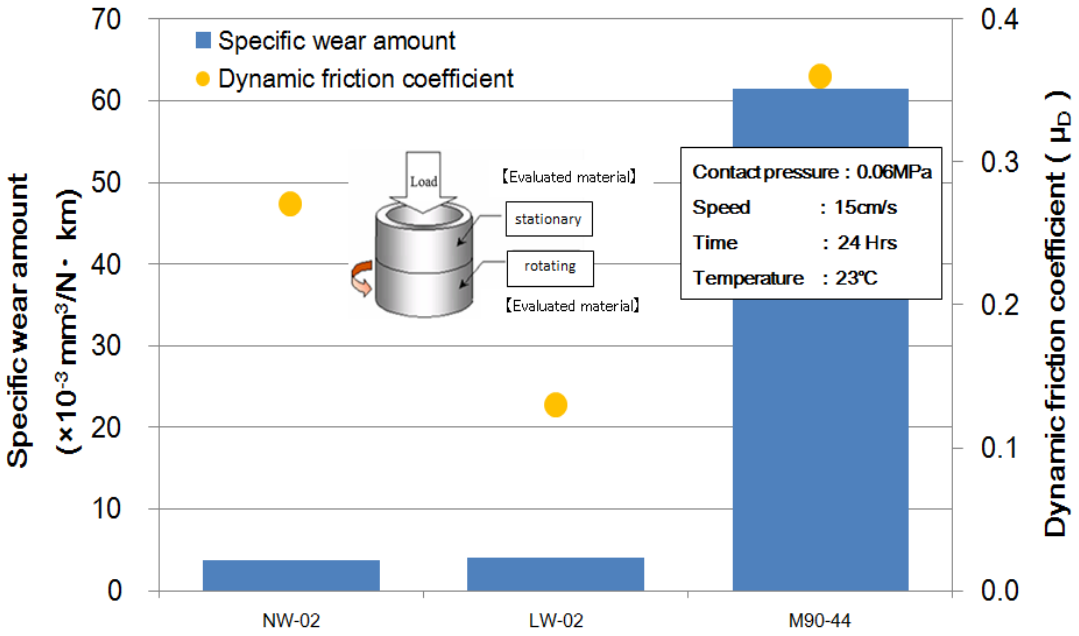


Figure 2-1 Comparison of friction and wear characteristics (when both mating materials are the same)

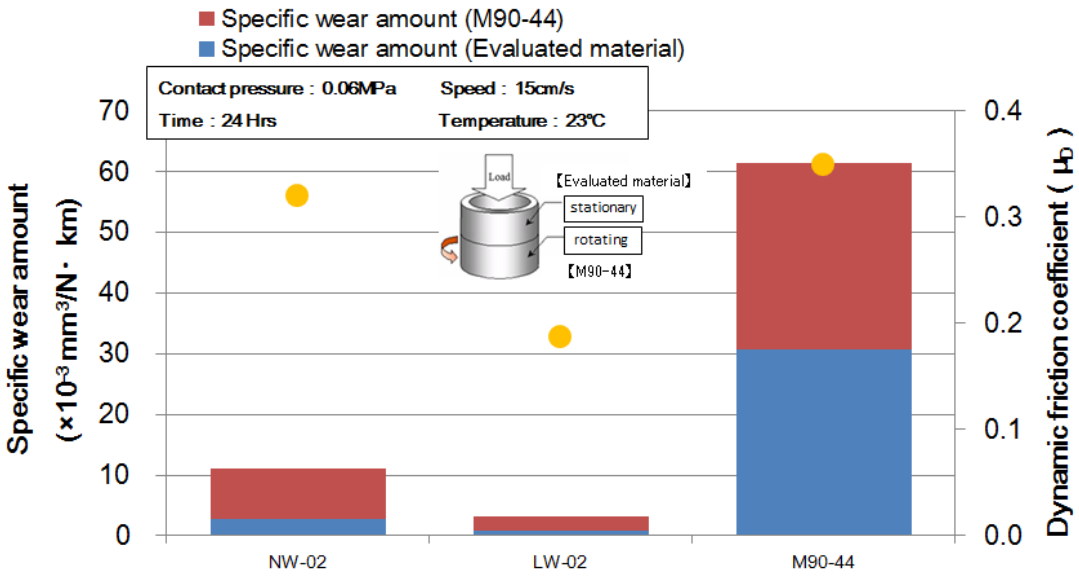


Figure 2-2 Comparison of friction and wear characteristics (when mating material is M90-44)

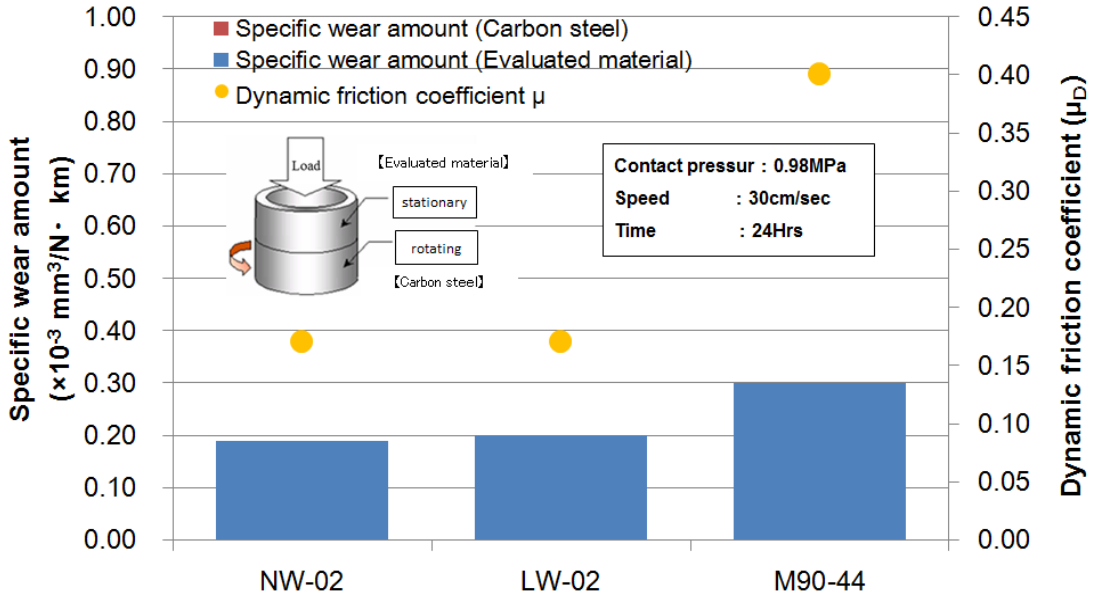


Figure 2-3 Comparison of friction and wear characteristics (when mating material is Carbon Steel)

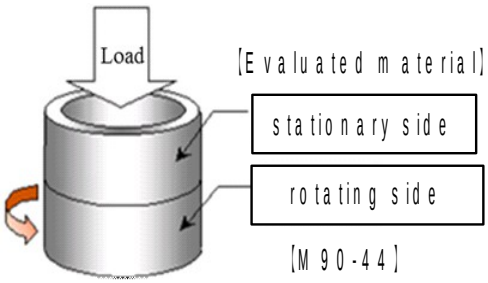
2.2 Squeaking noise

Using a thrust-type friction and wear testing machine, we measured the generating contact pressure of the squeak while gradually increasing the contact pressure. While it has a value lower than NW-02, it has a much better result than standard grade M90-44.

Table 2-1 Contact pressure at squeaking

	NW-02	LW-02	M90-44
Mating material	>10	6.5	0.1
M90-44	>10	1.1	0.1

Unit:MPa



3． Gear Characteristics of LW-02

3.1 Gear durability

LW-02 exhibits good gear durability. Despite its flexural modulus being lower than that of grade M90-44, gear durability is conversely higher. Through incorporation of a special lubricant, LW-02 the coefficient of friction between gear surfaces for LW-02 is extremely low and therefore, decreases in strength due to frictional heat can be suppressed.

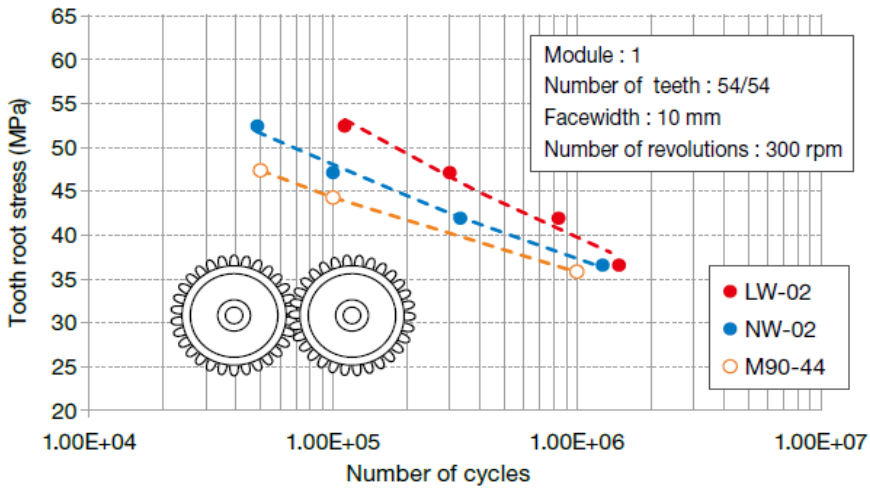


Figure 3-1　Gear tooth surface fatigue (against the same material)

3.2 Gear noise

LW-02 exhibits good gear noise properties. Friction vector reversal at the pitch points is thought to be one cause of gear noise. As previously mentioned, through formulating a special lubricant into LW-02, the friction coefficient at the gear surface becomes extremely low and because of this, vibrations due to friction vector reversal are suppressed.

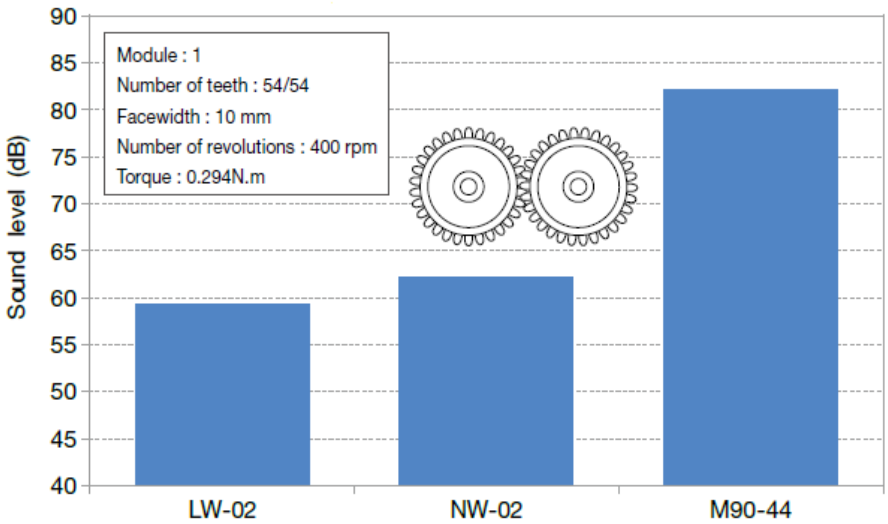


Figure 3-2　Gear noise (against the same material)

3.3 Gear wear

LW-02 exhibits good gear properties. Through incorporation of a special lubricant, the gear coefficient of friction is extremely low and adhesion between the same materials is greatly suppressed.

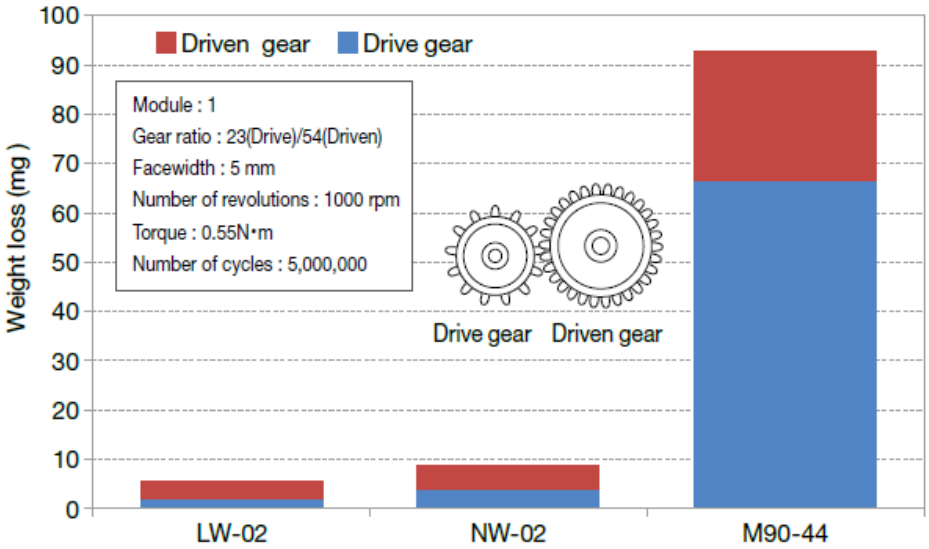
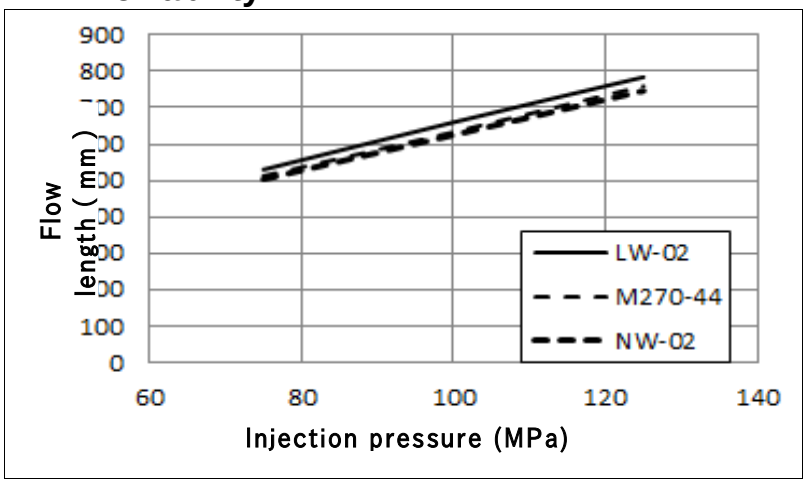


Figure 3-3 Gear wear (against the same material)

4． Moldability of LW-02

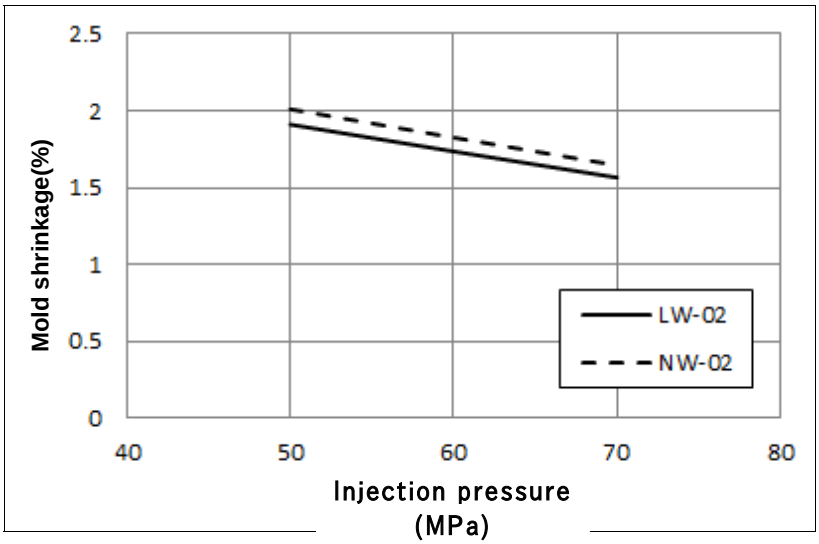
4.1 Flowability



<Molding conditions >
Cylinder temp ： 195℃
Mold temp ： 80℃
Injection speed ： 67mm/s

Figure 4-1 Flowability (2mmt)

4.2 Mold shrinkage



<Molding conditions >
Cylinder temp ： 195℃
Mold temp ： 70℃
Injection speed : 17mm/s
Mold ： 120×120×2mmt Flat plate side gated 4w×2t

Figure 4-2 Mold shrinkage (2mmt)

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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.
- It is the users' responsibility to investigate patent rights, service life and potentiality of applications introduced in this brochure. Materials we supply are not intended for the implant applications in the medical and dental fields, and therefore are not recommended for such uses.
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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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